CITY OF WICHITA

Drainage Plan Submittal Checklist

Reviewer: _____ Date: _____

Project Name: NewMarket Office Location: 29th at Maize

Total Land Area of Ownership: 40 Acres

Type: _____Residential ✓ Commercial _____Industrial _____Recreation _____Municipal _____Other

Applicant: Slawson Companies Contact: David Hambrick Phone #: 263-3201

Applicant email: _____

Surveyor: PEC Contact: _____ Phone#_____

Surveyor email: _____

Engineer: Professional Engineering Consultants, P.A. Contact: Joe Hickle Phone #262-2691

Engineer email: joseph.hickle@pec1.com

Please check the appropriate box: I = Included; NA = Non-Applicable; R= Required prior to development
(If "NA" is checked, an explanation must be entered)

Report Format and Content	Applicant			Engr	
Tab 1. General Information	**I**	**NA**	**Explanation / Location in Plan**	**I**	**NA**
1.1 CD of drainage plan, including preliminary Master Grading Plan, preliminary plat, and proposed plat, in PDF format and one half-size paper copy bound with this checklist included behind the cover to Storm Water Management by Thursday at 4 PM two weeks prior to the subdivision committee hearing on the final plat	✓				
1.2 Professional Engineer seal, signature and date on cover of report	✓				
1.3 Site location map, using color ortho photo with project boundaries	✓				
1.4 North arrow and scale on site location map	✓				
1.5 Discussion of development, existing conditions, and proposed impacts on storm water, wetlands, riparian zones, and floodplain	✓				
1.6 Discussion of offsite conditions	✓				
1.7 Summary table of runoff calculations (pre/post development); no increase in peak discharge for all storm series	✓				
1.8 Narrative description of the type and function of the permanent structural storm water management facilities	✓				

Report Format and Content	Applicant			Engr	
Tab 2. Existing Conditions Hydrologic Analysis	**I**	**NA**	**Explanation / Location in Plan**	**I**	**NA**
2.1 Existing Conditions Drainage Map					
2.1.1 Drainage map shows existing onsite and offsite topography; one foot contours required with spot elevations (NAVD 88 datum); onsite and offsite drainage delineated by modifying the Wichita/Sedgwick County LIDAR/hydrogeodatabase	✓				
2.1.2 Map shows existing streams, creeks, and waterways (perennial and intermittent), with names labeled and flow directions indicated by arrows	✓				
2.1.3 Map shows location and boundaries of natural features such as wetlands, lakes and ponds with the normal water elevation noted, rock outcroppings, wooded areas and tree rows					

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PEC Project No. 35-10553-6364

2.1.4 Map shows location of existing conveyance systems such as storm drains, inlets, catch basins, open channels, swales, and areas of overland flow, with flow directions indicated by arrows	✓				
2.1.5 Map shows existing structural elevations (e.g., pipes, manholes, etc.), and pipe materials and sizes	✓				
2.1.6 Map shows location, dimensions and elevations of existing bridges or culvert crossings		✓	None		
2.1.7 Map shows location of existing utilities (e.g., water, sewer, gas, electric, etc.) with labels and easements	✓				
2.1.8 Map shows ground water elevations, if applicable		✓	None		
2.1.9 Map shows delineation of predominant soils based on USDA soil surveys and/or onsite soil borings; indicate NRCS soil name and Hydrologic Soil Group (HSG) for undisturbed surface soils	✓				
2.1.10 Map shows existing land-use and cover per NRCS nomenclature	✓				
2.1.11 Map shows delineation of subareas (subbasins) for drainage calculations (subarea boundaries, subarea areas, impervious areas)	✓				
2.1.12 Map notes existing site footprint area and existing total impervious area (acres)		✓	Development Planned for 85% Impervious Area		
2.1.13 Map shows existing conditions time of concentration flow paths (segments, segment lengths, slopes, roughness parameters, and geometric properties if applicable) for each subarea	✓				
2.2 Existing Conditions Hydrology and Hydraulics Analysis and Results					
2.2.1 Discuss hydrologic analysis methodology used (e.g., unit hydrograph or other approved methods)	✓				
2.2.2 Provide table of existing subarea areas	✓				
2.2.3 Provide table of pre-developed runoff curve numbers with supporting calculations	✓				
2.2.4 Provide table of existing times of concentration with supporting calculations	✓				
2.2.5 Provide reference to source rainfall data used in the analysis, and a summary table of rainfall data	✓				
2.2.6 Provide cross-sections and other diagrams of existing open channels and other hydraulic features as required to illustrate basis for analysis		✓	None		
2.2.7 Provide existing conditions hydrologic and hydraulic analysis for runoff rates, volumes and velocities, showing assumptions and other support information not already cited in this checklist, including detailed calculations (2, 5, 10, 25 & 100 year, 24-hour storm events); present results in table form; provide copies of any computer files and models used on CD	✓				

Report Format and Content	Applicant			Engr	
Tab 3. Post-Development Hydrologic Analysis	**I**	**NA**	**Explanation / Location in Plan**	**I**	**NA**
3.1 Post-Development Drainage Map (portion of existing conditions drainage map covering project site area revised to show items indicated below)					
3.1.1 General Features on Map					
3.1.1.1 Map shows preliminary onsite post-development contours (NAVD 88 datum) and project boundary	✓				

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3.1.1.2 Map shows any existing onsite features (e.g., structures and channels) noted in Tab 2 that are to remain after development	✓				
3.1.1.3 Map shows location of proposed roads, buildings, parking lots and other impervious areas	✓				
3.1.1.4 Map shows location of proposed utilities (e.g., water and sewer) and easements	✓				
3.1.1.5 Map shows offsite through-drainage confined to an easement, dedication, and/or reserve		✓			
3.1.1.6 Map shows delineation of predominant soil HSGs based on anticipated soil textures and NRCS guidelines if post-development soil characteristics will be different from existing soil characteristics		✓			
3.1.1.7 Map shows post-development land-use and cover per NRCS nomenclature	✓				
3.1.1.8 Map shows delineation of subareas (subbasins) for onsite drainage calculations (subarea boundaries, subarea areas, impervious areas and curve numbers)	✓				
3.1.1.9 Map shows proposed limits of clearing and grading	✓				
3.1.1.10 Map shows post-development time of concentration flow paths (segments, Tc, segment lengths, slopes, roughness parameters, and geometric properties if applicable) for each project site subarea	✓				
3.1.2 Locations of Proposed Conveyances and BMPs					
3.1.2.1 Map shows location of proposed conveyance systems (including backyard drainage) such as storm drains, inlets, catch basins, open channels, swales, and areas of overland flow, with flow directions indicated by arrows		✓			
3.1.2.2 Map shows proposed structural elevations (e.g., pipes, manholes, etc.), and pipe materials and sizes	✓				
3.1.2.3 For any drainage area of 40 acres or more (either onsite or offsite through drainage), map shows the flow confined to an open channel with required side benches and freeboard, or if partially enclosed conforms to applicable policy and design criteria		✓			
3.1.2.4 Map shows locations of storm water management facilities and 20' wide maintenance access easements	✓				
3.1.2.5 Map shows proposed energy dissipator and channel protection locations		✓			
3.1.2.6 Map shows location and dimensions of proposed channel, bridge or culvert crossing modifications		✓			
3.1.2.7 Map shows 100-year pool elevation and normal pool elevation for ponds (see section 3.2)	✓				
3.1.2.8 Map shows permanent concrete outfall control structure for ponds	✓				
3.1.2.9 Map shows emergency overflow and top of berm elevation for ponds	✓				
3.1.2.10 Map shows all floodplains, ponds and storm water management facilities in reserves	✓				
3.2 Post-Development Conditions Hydrology and Hydraulics Analysis and Results					
3.2.1 Discuss hydrologic analysis methodology used (e.g., unit hydrograph or other approved methods)	✓				
3.2.2 Provide table of existing onsite subarea areas	✓				

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3.2.3 Provide table of post-development runoff curve numbers with supporting calculations	✓				
3.2.4 Provide table of onsite post-development time of concentrations with supporting calculations	✓				
3.2.5 Provide cross-sections and other diagrams of proposed open channels and other hydraulic features as required to illustrate basis for analysis		✓			
3.2.6 Provide post-development conditions hydrologic and hydraulic analysis for runoff rates, volumes and velocities, showing assumptions and other support information not already cited in this checklist, including detailed calculations (2, 5, 10, 25 & 100 year, 24-hour storm events). For off-line projects, or on-line projects where project drainage area exceeds 10% of total on-line drainage area, calculations cover the site and extend downstream to a point where the proposed project site drainage area is equal to or less than 10% of the total drainage area at that point. In addition, for on-line projects analysis is extended downstream far enough to ensure no increase in peak flow rates. Present results in table form for all conveyances and structures; provide copies of any computer models used on CD	✓				
3.2.7 For ponds, provide stage-storage-discharge or outlet rating curves and inflow-outflow hydrographs	✓				
3.2.8 For ponds, demonstrate that the pond contours on the master grading plan and the stage-storage data are consistent	✓				
3.2.9 For ponds, provide one foot of freeboard above the 100-year, 24-hour HWL	✓				
3.2.11 Demonstrate that flows discharged from the project site are discharged in the same manner as before development, using level spreaders, other devices, or grading as required, or identify an appropriate flowage easement	✓				
3.3 Storm Water Control Sizing					
3.3.1 Based on flows determined from the hydrology and hydraulics analysis, provide hydraulic sizing calculations for storm water controls	✓				
3.3.2 Present, in table form, sizes, elevations, flows, velocities, and depths for each control, as applicable; verify that velocities are self-cleaning and non-erosive		✓			
3.3.3 Provide typical details (including cross-sections where applicable) for outlet structures, embankments, spillways, grade control structures, conveyance channels, inlets, etc.	✓				
3.4 Storm Water Management Facilities					
3.4.1 For each storm water management facility, in table form, describe facility, its TSS removal efficiency, total contributing drainage area, total contributing impervious area	✓				
3.4.2 Provide 20' wide maintenance access for each facility					
3.4.3 Maintenance responsibility of facilities specified in the platters text. (i.e., Home Owners Association, Lot Owners Association, or lot owner)	✓				
3.4.4 Water quality protection volume calculations	✓				
3.4.5 Channel protection volume calculations		✓			
3.4.6 Water quality TSS removal calculations showing TSS removal for the site equals or exceeds 80%.	✓				

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3.4.8 Water quality and channel protection volume orifice size calculations		✓			
3.4.9 Other calculations required for each facility as specified in the Storm Water Technical Guidance Manual		✓			
3.4.10 Plans and typical details for each facility					

Report Format and Content	Applicant			Engr	
Tab 4. Floodplain Submittal	**I**	**NA**	**Explanation / Location in Plan**	**I**	**NA**
4.1 Provide source of flood profile, floodplain, floodway, and discharges information	✓		HEC-HMS Model		
4.2 Delineation of nearest base flood elevations		✓			
4.3 Delineation of pre-developed regulatory floodplain/floodway limits using FEMA's current GIS database; limits to be per elevation and scaled location		✓			
4.4 Delineation of post-developed regulatory floodplain and floodway limits; limits to be per elevation and scaled location, with project limits shown		✓			
4.5 Provide floodway data table and discharges		✓			
4.6 Provide all hydrologic and hydraulic study information for local floodplain studies, unnumbered Zone A elevation determinations and floodplain map revisions or required permits		✓			
4.7 Provide regulatory floodway and four natural profile models (10, 50,100, and 500-yr) for existing and future watershed conditions		✓			
4.8 Floodplains and floodways located within a reserve, where necessary	✓				
4.9 Floodplain cut and fill calculations for storage sensitive basins	✓				
4.10 Demonstrate that floodway elevations and velocities do not increase due to construction in a floodway ("No Rise Certification")		✓			

Report Format and Content	Applicant			Engr	
Tab 5. Federal, State and Local Permits (to be provided prior to construction unless otherwise specified)	**I/R**	**NA**	**Explanation / Location in Plan**	**I/R**	**NA**
5.1 US Army Corps of Engineers – regulatory program permits (Section 404 permit)		✓			
5.2 Kansas Department of Agriculture - Division of Water Resources Permits (Stream Obstruction, Channel Change, Flood Plain Fill, Levee, Water Appropriations, Dam Safety permit, etc.)	R				
5.3 Federal Emergency Management Agency (FEMA) Letter of Map Changes (LOMA, LOMR, LOMR-f, CLOMR, etc.); shall be included and approved when project modifies the limits of the floodway		✓			

Report Format and Content	Applicant			Engr	
Tab 6. Half-Scale Preliminary Master Grading Plan	**I**	**NA**	**Explanation / Location in Plan**	**I**	**NA**
(One set of plans and a PDF shall be submitted to Storm Water Management. The final approved plan shall be sealed, signed and dated prior to Engineering receiving the final sanitary sewer plans.)	✓				
6.1 Signed and sealed by Professional Engineer	✓				
6.2 Title block, includes subdivision name and phase		✓			
6.3 Cross hatch out future phases as information only					
6.4 Dated revision documentation above title block		✓			
6.5 Scale not greater than 1 inch = 60 feet	✓				
6.6 North arrow		✓			

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6.7 Index or legend key	✓				
6.8 Benchmarks (minimum of two) used for site control (NAVD 88 vertical datum)	✓				
6.9 Existing contours of entire site, with contour interval of one foot	✓				
6.10 Proposed contours for channels, ponds, and other permanent storm water management facilities (including ponds), with contour interval of one foot	✓				
6.11 Spot elevations shown to nearest tenth of a foot for critical locations		✓			
6.12 Proposed street and lot layout	✓				
6.13 Underground storm drain locations		✓			
6.14 Overflow locations for storms exceeding storm drain capacity		✓			
6.15 Top elevations of storm drains at all inlets, manholes, and flow line elevations for all outfalls		✓			
6.16 Locations of open ditches and lakes	✓				
6.17 Flow direction arrows	✓				
6.18 Proposed flow line elevations of all open ditches at maximum 100 feet intervals, and 100 year flood elevations thereon		✓			
6.19 Ponds: pond bottom elevation	✓				
6.20 Ponds: normal pool elevation	✓				
6.21 Ponds: 100 year flood elevation	✓				
6.22 Ponds: emergency overflow elevation	✓				
6.23 Proposed top-of-curb elevations at points where drainage will be required to flow over the curb		✓			
6.24 Platted minimum building opening elevation for each lot, in table form for all lots (excluding basement floor elevations)	✓				
6.25 Standard foundation and elevation detail for slab on grade, full basement, view-out, partial view-out and/or walk-out construction		✓			
6.26 Each lot: Top of foundation elevation	✓				
6.27 Each lot: Notation for builders as to the type of structure that may be constructed and the view-out, walk-out or pad elevation as applicable					
6.28 All lots above 100-year flood elevation	✓				
6.29 Grading around structures conforms to perimeter drainage requirements	✓				
6.30 Backyard drainage conforms to backyard drainage requirements	✓				
6.31 Adjacent subdivision lot lines, with lot labels and subdivision names		✓			
6.32 All easements, right-of-ways and reserves shown	✓				
6.33 Statement on proposed final plat: "A drainage plan has been developed for the subdivision and all drainage easements, right-of-ways, or reserves shall remain at the established grades and unobstructed to allow for the conveyance of storm water." Note that the final Master Grading Plan must have a statement that certifies the plan complies with the approved Final Drainage Plan, or if not, an addendum to the Drainage Plan is included with the final Master Grading Plan.	✓				

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Tab 1
General Information

New Market Office Drainage Evaluation

This 40-acre site on the north side of 29th Street and west of Maize Road in Wichita is planned to be re-platted. The site will be developed in phases with all internal drainage directed into a stormwater detention pond.

Existing Conditions:
The Fontana Development upstream of this site discharges its runoff through a series of ponds into the site. Other offsite drainage to the north of the site similarly discharges runoff into the site's waterway. The site has a depressed ephemeral waterway running through it that conveys this offsite runoff to an existing 10'x4' RCB underneath 29th Street.

Peak flows into, through and from the project site are significant. One offsite basin (WN-3) and two offsite retention ponds (WN-P1 and WF-P4) contribute runoff into the project pond. Additionally the site basin itself (WN-2) will produce runoff into the pond. The total of these flows represents the pre-development condition peak flow rates that pass through the project site. See Table 1. HEC-HMS basin flow output for the pre-development condition is enclosed. The hydraulic nodal naming reference presented here is from the Cadillac Lake Drainage Study.

According to the Sedgwick County Soil Survey, soils on this site are partly Hydrologic Soil Group B and D soils. Soils map include.

Water Quality Regulations:
The water quality treatment volume from the developed site will approximate 3.2 AF. This volume will be contained in the permanent pool volume of the stormwater detention lake. Submerged pond contours are shown as to how the lake will be constructed. The lake's volume will greatly exceed this volume and is estimated in excess of 26 AF. Table 2 shows the water quality volume calculation.

Channel Bank Protection Regulation:
Discussion with the City's Stormwater Engineer reached an agreement that the channel bank protection volume of the new stormwater regulations is not applicable for this project.

Detention Regulations:
The normal stormwater detention regulations for the 2, 5, 10, 25 and 100 year 24-hour precipitation events will be satisfied by the proposed lake. The post-development peak discharge rates from the pond are less than the peak runoff rates in the pre-development condition from all sources in Table 1. Rainfall amounts are per the City's design manual.

This project is an integral part of the large Cadillac Lake drainage basin. The HEC-HMS stormwater model that PEC is developing for the larger basin was used to assess the upstream and downstream flow conditions through and from this project site.

Due to the magnitude of the 100-year peak flow rate a large concrete spillway is necessary to convey the flow. A concrete spillway 20 feet in length is proposed. Table 3 displays the post-development peak flow rate from the project site and the pond's discharge rates relative to the pre-development flow rates. HEC-HMS basin flow output for the post-development condition is enclosed.

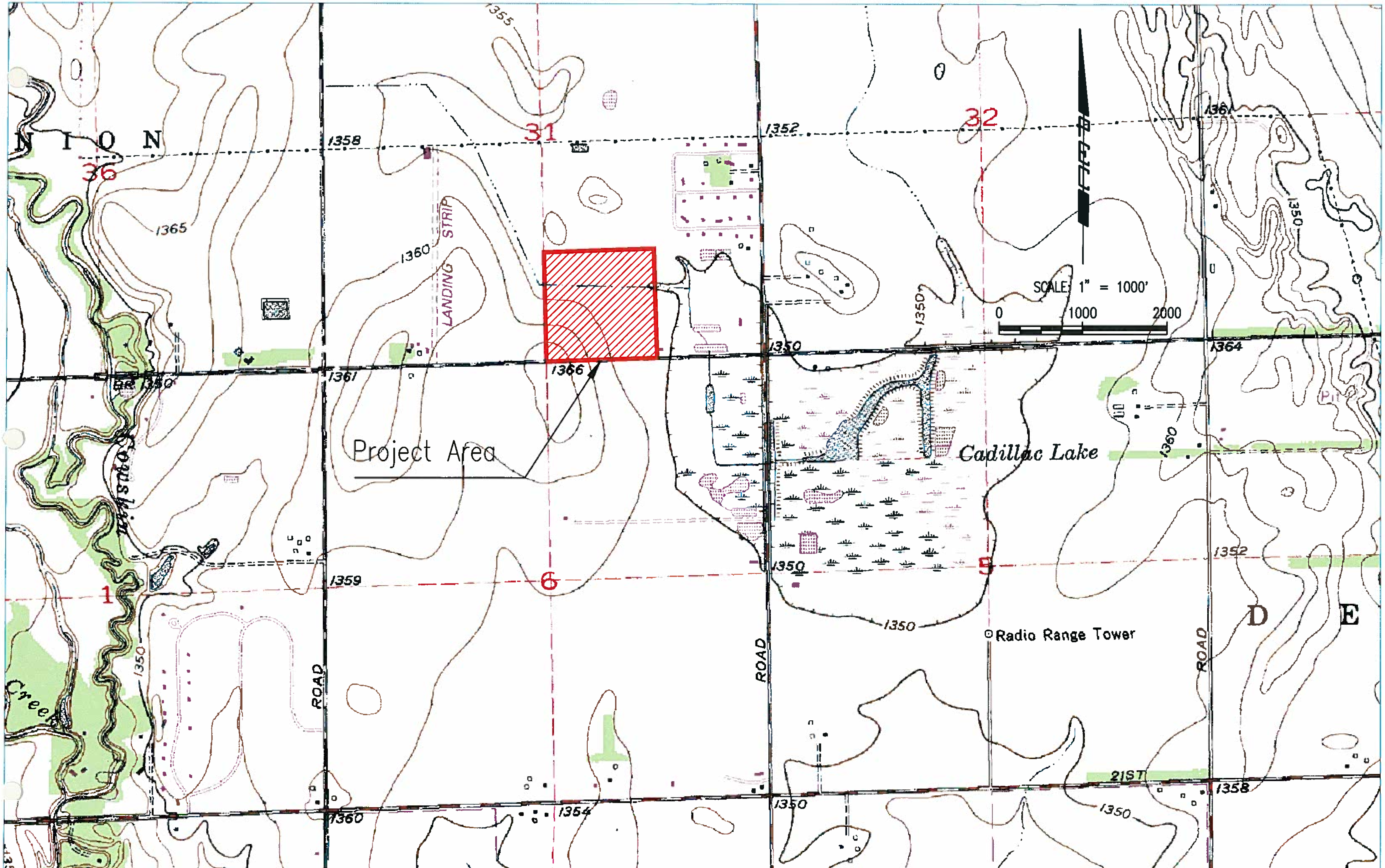
The proposed pond will have two different stages. The upstream portion (WN-P4) will have a static elevation of 1350.0 while the downstream portion (WN-P2) will a static elevation of 1349.0. The upper pond will directly discharge via 3-4'x8' box culverts into the lower pond.

The pond will have two road crossings in the future. Those crossings are planned by the installation of reinforced concrete box culverts (RCB) at the location of the platted streets. The RCB culverts have been sized to convey the outflow from the offsite subdivision pond (WF-P4) upstream from the west. This flow is estimated by the model at 286 cfs.

Floodplain Considerations:

Previous 100-year Base Flood Elevation (BFE) of 1352.4 at the project site was considered for compensating floodplain storage before and after project construction. Tables 4A through 4C present this evaluation. The City's Lidar mapping was used to estimate the surface area of flooding at various elevations (1350 to 1353) for the existing condition. The stage storage configuration of the proposed pond was determined for detention routing modeling and used to compare to the pre-condition. 14.42 AF of floodplain storage is available on site prior to development and 19.58 AF would be available in the proposed pond above the static water level. The compensating floodplain storage requirement is met.

Previous 100-year Base Flood Elevation (BFE) of 1352.4 at the project site was computed with a smaller pond on the north side of 29th Street than is being proposed in this development. Consequently a lower BFE is predicted in this pond within the new development. More water can be detained upstream of 29th Street than in the original Cadillac Lake Drainage Study. The preliminary study did not account for this now planned site development. Also 29th Street has been raised changing the site discharge conditions to downstream nodes.


Project Area
SCALE: 1" = 1000'
0
1000
2000
Cadillac Lake
Radio Range Tower
LANDING STRIP
ROAD
ROAD
ROAD
21ST
31
32
36
6
5
1
1358
1352
1361
1365
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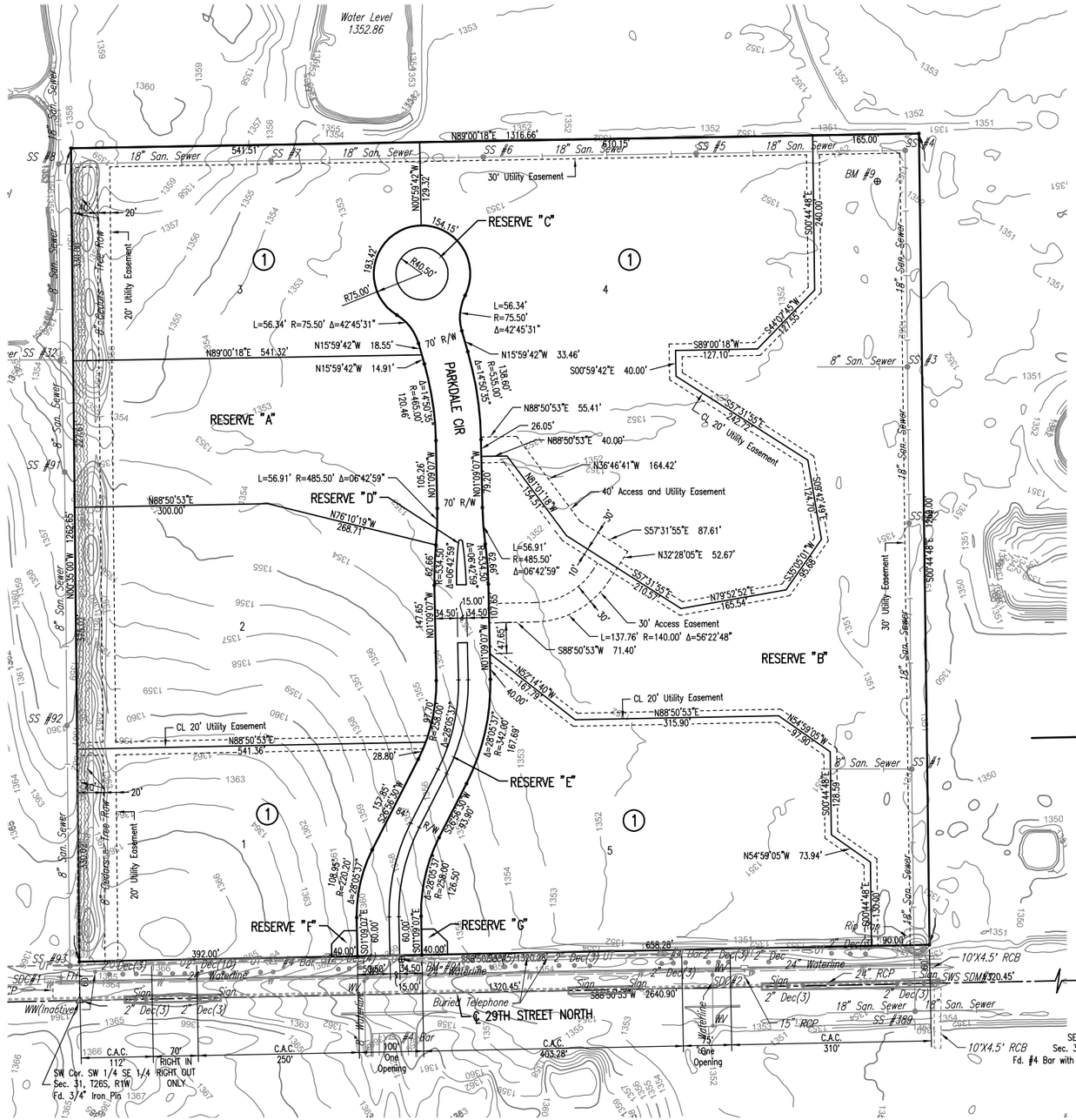
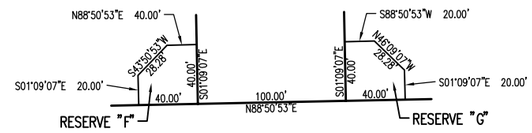
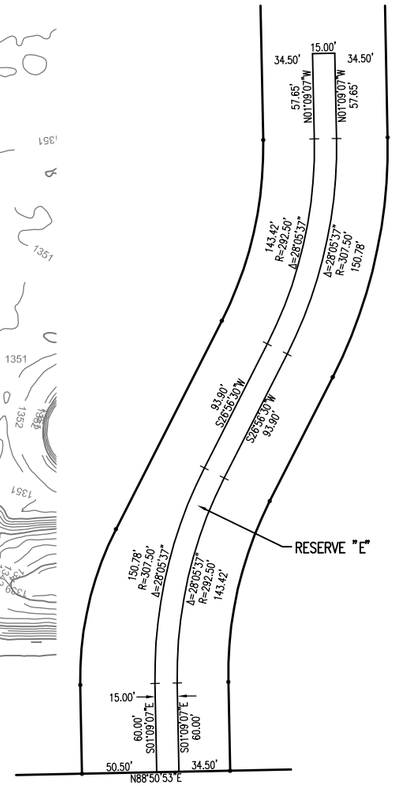
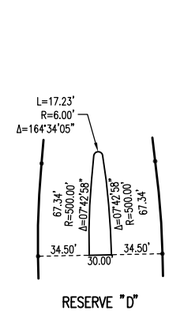
NEWMARKET OFFICE 2ND

AN ADDITION TO WICHITA, SEDGWICK COUNTY, KANSAS









SCALE: 1" = 100'

• = 1/2" REBAR W/PEC CAP UNLESS OTHERWISE NOTED

BENCHMARKS:

BM #9

T-POST 70' +/- WEST AND 75' SOUTH OF NORTHEAST CORNER SW 1/4 SE 1/4 SEC. 31, T26S, R1W

ELEV. 1351.58 NAVD 88

BM #9A

CHISELED SQUARE AT NORTHEAST CORNER OF CONCRETE DRIVE APPROACH, SOUTH SIDE OF SIDEWALK ON NORTH SIDE OF 29TH STREET, AT INTERSECTION OF 29TH AND PARKDALE.

ELEV. 1359.26 NAVD 88

STATE OF KANSAS } SS
COUNTY OF SEDGWICK }

WE, PROFESSIONAL ENGINEERING CONSULTANTS, P.A., ENGINEERS AND SURVEYORS IN AFORESAID STATE AND COUNTY, DO HEREBY CERTIFY THAT OF

THIS _____ DAY OF _____, 2011, WE HAVE SURVEYED

AND PLATTED NEWMARKET OFFICE 2ND, AN ADDITION TO WICHITA, SEDGWICK COUNTY, KANSAS, INTO LOTS, A BLOCK, AND RESERVES THE SAME BEING DESCRIBED AS FOLLOWS:

A REPLAT OF LOT 1, BLOCK 1, AND RESERVE "A" OF NEWMARKET OFFICE AN ADDITION TO WICHITA, SEDGWICK COUNTY, KANSAS.

ALL PUBLIC EASEMENTS LYING WITHIN THE ABOVE DESCRIBED TRACT OF LAND ARE HEREBY VACATED AND REPLATTED BY VIRTUE OF KSA 12-512(b) AMENDED.

ALL ABUTTERS RIGHT OF ACCESS TO AND FROM 29TH STREET NORTH OVER AND ACROSS THE SOUTH PROPERTY LINE IS HEREBY GRANTED TO THE CITY OF WICHITA, PROVIDED HOWEVER THAT THERE SHALL BE ACCESS TO 29TH STREET NORTH AT THREE OPENINGS AS SHOWN.

JAMES R. BECKETT, R.L.S. NO. 832
PROFESSIONAL ENGINEERING CONSULTANTS, P.A.

FEMA FLOOD PLAIN AND REGULATORY FLOODWAY BOUNDARIES ARE SUBJECT TO PERIODIC CHANGE, AND SUCH CHANGE MAY AFFECT THE INTENDED LAND USE WITHIN THE SUBDIVISION.

RESERVES "A" AND "B" ARE HEREBY PLATTED FOR DRAINAGE, LAKES, LANDSCAPING, SIDEWALKS, AND UTILITIES, CONFINED TO EASEMENTS. RESERVES "C," "D," AND "E," ARE HEREBY PLATTED FOR DRAINAGE, LANDSCAPING, AND ACCESS DRIVES. RESERVE "E" SHALL ALLOW FOR PUBLIC ACCESS ACROSS AT VARIOUS LOCATIONS FOR DRIVEWAYS, AS APPROVED BY THE CITY ENGINEER. RESERVES "F" AND "G" ARE HEREBY PLATTED FOR ENTRY MONUMENTS, LANDSCAPING, AND SIGNS. RESERVES "A" THRU "G" SHALL BE OWNED AND MAINTAINED BY AN OWNER'S ASSOCIATION TO BE FORMED WITHIN NEWMARKET OFFICE 2ND ADDITION.

EASEMENTS FOR THE CONSTRUCTION AND MAINTENANCE OF PUBLIC UTILITIES ARE HEREBY GRANTED.

A DRAINAGE PLAN HAS BEEN APPROVED FOR THIS PLAT. ALL DRAINAGE EASEMENTS, RIGHTS-OF-WAY, OR RESERVES SHALL REMAIN AT ESTABLISHED GRADES AND UNOBSTRUCTED TO ALLOW FOR THE CONVEYANCE OF STORM WATER, UNLESS MODIFIED WITH THE APPROVAL OF THE CITY ENGINEER.

KNOW ALL MEN BY THESE PRESENTS THAT WE, THE UNDERSIGNED PROPERTY OWNERS OF THE LAND AS ABOVE SET FORTH IN THE SURVEYOR'S CERTIFICATE, HAVE CAUSED THE LAND TO BE SURVEYED AND PLATTED INTO LOTS, A BLOCK, AND RESERVES THE SAME TO BE KNOWN AS NEWMARKET OFFICE 2ND, AN ADDITION TO WICHITA, SEDGWICK COUNTY, KANSAS.

MINIMUM PAD ELEVATIONS (LOWEST OPENING) SHALL BE AS FOLLOWS:

BLOCK 1	N.A.V.D. 88
LOTS 2 & 3	1355.0
LOTS 4 & 5	1354.0

OWNERS:
NEWMARKET OFFICE, LLC, A KANSAS LIMITED LIABILITY COMPANY

_____
JERRY JONES, VICE PRESIDENT

STATE OF KANSAS } SS
COUNTY OF SEDGWICK }

THIS INSTRUMENT WAS ACKNOWLEDGED BEFORE ME ON THIS _____ DAY OF _____, 2011, BY JERRY JONES, VICE PRESIDENT OF

NEWMARKET OFFICE, LLC, A KANSAS LIMITED LIABILITY COMPANY

_____, NOTARY PUBLIC
SARAH E. HATTRUP

MY APPOINTMENT EXPIRES: _____

STATE OF KANSAS } SS
COUNTY OF SEDGWICK }

THIS PLAT OF NEWMARKET OFFICE 2ND, AN ADDITION TO WICHITA, SEDGWICK COUNTY, KANSAS, HAS BEEN SUBMITTED TO AND APPROVED BY THE WICHITA-SEDGWICK COUNTY METROPOLITAN AREA PLANNING COMMISSION, WICHITA, KANSAS.

DATED THIS _____ DAY OF _____, 2011.

WICHITA-SEDGWICK COUNTY METROPOLITAN AREA PLANNING COMMISSION

_____, CHAIRMAN
DEBRA MILLER STEVENS

_____, SECRETARY
JOHN L. SCHLEGEL

REVIEWED IN ACCORDANCE WITH K.S.A. 58-2005 ON THIS _____ DAY

OF _____, 2011.

_____
TRICIA L. ROBELLO, LS #1246
DEPUTY COUNTY SURVEYOR
SEDGWICK COUNTY KANSAS

ENTERED ON TRANSFER RECORD THIS _____ DAY OF _____, 2011.

_____, COUNTY CLERK
DON BRACE

THIS IS TO CERTIFY THAT THIS INSTRUMENT WAS FILED FOR RECORD IN THE

REGISTER OF DEEDS OFFICE AT _____ .M., ON THE _____ DAY

OF _____, 2011.

_____, REGISTER OF DEEDS
BILL MEEK

_____, DEPUTY
TONYA BUCKINGHAM

THIS PLAT IS APPROVED AND ALL DEDICATIONS SHOWN HEREON, IF ANY ARE ACCEPTED BY THE CITY COUNCIL OF THE CITY OF WICHITA, KANSAS, THIS

_____ DAY OF _____, 2011.

_____, MAYOR
CARL BREWER

_____, CITY CLERK
KAREN SUBLETT

Professional Engineering Consultants, P.A.
303 S. TOPEKA • WICHITA, KANSAS 67202
316-262-2691 • FAX 316-262-3003

Saved 01-31-2011 8:41:04 AM by IDK
Plot Scale 1:204.6512 02-02-2011 11:43:35 AM by JOSH A. GOAKA
Q:\2010\10553\10553 One-Step Plat

Tab 2
Existing Conditions Hydrologic Analysis

SCALE: 1" = 100'

0 100 200

LEGEND

FLOW DIRECTION =
TC PATH =
DRAINAGE BASIN =

BENCHMARKS:

BN #9

T-POST 70' +/- WEST AND 75' SOUTH OF NORTHEAST CORNER SW 1/4 SE 1/4 SEC. 31, T26S, R1W

ELEV. 1351.58 NAVD 88

BN #9A

CHISELED SQUARE AT NORTHEAST CORNER OF CONCRETE DRIVE APPROACH, SOUTH SIDE OF SIDEWALK ON NORTH SIDE OF 29TH STREET, AT INTERSECTION OF 29TH AND PARKDALE.

ELEV. 1359.26 NAVD 88

STORM SEWER:

SDC #1
CURB INLET
TOP 1364.65
15" RCP (S) FL 1360.65

SDC #2
CURB INLET
TOP 1353.88
15" RCP (S) FL 1350.43

SDM #1
MANHOLE
TOP 1355.02
24" RCP (W) FL 1347.42

RCBC **at 29th Street**
10' WIDE X 4.5' HIGH
TOP OF HEADWALL 1355.26
FL 1347.56

Table 1 – Existing Conditions Summary

				Peak Outflows by Storm Frequency (cfs)				
Basin/Pond	Area (AC)	Tc(min.)	CN	2 Year	5 Year	10 Year	25 Year	100 Year
WN-P1	35.60	67	70	15.1	34.0	43.1	55.0	78.3
WN-2 PRE	38.11	45	75	35.6	53.0	66.0	83.2	116.8
WF-P4	170.0	104	68	68.7	108.9	141.3	188.1	285.8
WN-3	11.76	15	96	33.7	44.1	51.4	60.7	78.1
			TOTAL	153.1	240.0	301.8	387.0	559.0

No.	Revision	By	Date

EXISTING CONDITONS MAP
NEWMARKET OFFICE 2ND
WICHITA, KANSAS

Professional Engineering Consultants, P.A.
303 S. TOPEKA • WICHITA, KANSAS 67202
316-262-2691 • FAX 316-262-3003

Designed by	JEH	Job No.	10553	Sht. 1 of 1
Drawn by	AEE	Date	01/14/11	

Table 1 - Exisiting Conditions Summary								
				Peak Outflows by Storm Frequency (cfs)				
Basin/Pond	**Area (AC)**	**Tc (min.)**	**CN**	**2 Year**	**5 Year**	**10 Year**	**25 Year**	**100 Year**
WN-P1	35.60	N/A	70	15.1	34	43.1	55	78.3
WN-2 PRE	38.11	45	75	35.6	53	66	83.2	116.8
WF-P4	170.00	N/A	68	68.7	108.9	141.3	188.1	285.8
WN-3	11.76	15	96	33.7	44.1	51.4	60.7	78.1
			TOTAL	**153.1**	**240**	**301.8**	**387**	**559**

Time of concentration (Tc) or travel time (Tt)

Project : Newmarket Office **By:** JAG **Date:** 1/31/2011
Location : Wichita, Kansas **Checked:** **Date:**

Circle One: [Present] Developed Basin: WN-2

Circle One: [Tc] Tt through subarea

NOTES: Space for as many as two segments per flow type can be used for each worksheet.
Include map, schematic, or description of flow segments.

Sheet flow (Applicable to Tc only)

		Segment ID		
		AB		
1. Surface description (Table 3-1)		Cultivated SoiL		
2. Mannings roughness coeff., n (Table 3-1)		0.060		
3. Flow length, L (total L < 300 ft.)	ft	135		
4. Two-yr 24-hr rainfall, P2	in	3.50		
5. Calculated Land slope, s	ft/ft	0.011		
5a. Land Elevation For Upper End Of Flow Path		1359.5		
5b. Land Elevation For Lower End Of Flow Path		1358.0		
6. Compute Tt	hr	0.12	=	0.12

Shallow concentrated flow

		Segment ID		
		BC		
7. Surface description (Paved or Unpaved)		Unpaved		
8. Flow length, L	ft	2187		
9. Calculated Watercourse slope, s	ft/ft	0.004		
9a. Land Elevation For Upper End Of Flow Path		1358.0		
9b. Land Elevation For Lower End Of Flow Path		1350.0		
10. Average velocity, V (Figure 3-1)	ft/s	0.98		
11. Tt = L/3600V Compute Tt	hr	0.62	=	0.62

Channel Flow

		Segment ID		
		CD		
12. Cross sectional flow area, a	sf	100.00		
13. Wetted perimeter, Pw	ft	100		
14. Hydraulic radius, r = a/Pw Compute r	ft	1.000		
15. Channel slope, s	ft/ft	0.002		
16. Manning's roughness coeff., n		0.041		
17 V = 1.49(r^0.667)(s^0.50)/n Compute V	ft/s	1.6		
18. Flow length, L	ft	0		
19. Tt = L/3600V Compute Tt	hr	0.000	=	0.00
20. Watershed or subarea Tc or Tt (add Tt in steps 6,11, and 19)			hr	0.74

Reference: Urban Hydrology for Small Watersheds
Technical Release 55, Soil Conservation Service
U.S. Department of Agriculture, June 1986

Use Time Of Concentration = 45 Minutes

ALLIED LABORATORIES
DEPARTMENT OF PROFESSIONAL ENGINEERING CONSULTANTS, P.A.

January 12, 2011

Mr. Joseph Hickle, P.E.
Professional Engineering Consultants, P.A.
303 South Topeka
Wichita, Kansas 67202

Re: **Subsurface Exploration**
New Market Square Office Complex Detention Ponds
29th Street North and Maize Road
Wichita, Kansas
Allied File No. 74-10553-147

Mr. Hickle,

As requested, Allied Laboratories has performed a subsurface exploration for the referenced project. The exploration was conducted to obtain information on the subsurface conditions and provide general recommendations for project design. All work was performed under the direction of a registered Professional Engineer.

The following sections present the results of the field exploration, laboratory testing and our recommendations for project design. The analysis and recommendations are based on the subsurface conditions encountered in the borings and the project information available at the time of this report. If project details including structure locations, elevations, loads, cut and fill depths or other conditions change during design, or if the subsurface conditions vary from those described in this report, the analysis and recommendations may need to be re-evaluated and adjusted.

FIELD EXPLORATION

The field exploration conducted on January 7, 2011 consisted of 3 exploratory borings. The borings were drilled to depths of 15 feet with a Mobile Drill B-31 drill rig using 6 inch continuous flight auger. Subsurface conditions in the exploratory borings were logged in the field by Allied Laboratories personnel referencing ASTM D-2488 procedures. Water level measurements were obtained or attempted in the borings shortly after completion of drilling. Samples of the subsurface soils were obtained from auger cuttings during drilling.

Boring locations were determined by the drilling crew by measuring from existing site features and estimating right angles. Approximate boring locations are shown on the attached Boring Location Sketch (Figure 1). Ground surface elevations were assumed to be 100.0 at the boring locations. Ground surface elevations and boring locations determined by the drilling crew are approximate.

FORWARD ALL MAIL TO
ALLIED LABORATORIES
303 SOUTH TOPEKA
WICHITA, KANSAS 67202
E-MAIL: Allied@PEC1.com

CONSTRUCTION/SURVEY/GEOTECHNICAL DIVISIONS LOCATED AT
350 SOUTH WASHINGTON
WICHITA, KANSAS 67202
(316) 262-6457
FAX NO. (316) 262-6592

LABORATORY TESTING

Soil samples obtained during the field exploration were observed and visually classified in our laboratory referencing ASTM D-2488 procedures which are based on the Unified Soil Classification System. Selected samples were tested to determine engineering and physical properties. Tests were performed referencing current ASTM procedures unless otherwise noted on the attached figures. Tests performed included moisture content, minus 200 content and Atterberg Limits. Laboratory test results are summarized on the attached boring logs and figures.

SITE CONDITIONS

This section presents brief descriptions of the soil, bedrock, groundwater and other conditions encountered in the exploratory borings and observed at the site. The attached Boring Logs should be reviewed for additional information on the subsurface conditions at each boring location. Sharp transitions between various soil/bedrock types are presented on the boring logs. However, soil transitions may occur gradually and depths to the transitions are approximate. The borings are based on visual observations and periodic sampling. Additional sampling, testing and Petrographic analysis may provide a different classification of soil and bedrock types.

SOILS

The subsurface profile in the borings consisted of variable mixtures of sand, silt and clay soils. The subsurface profile was generally logged as 2 to 5 feet of medium to high plasticity clay with trace sand overlying variable layers of sandy clay and clayey sand overlying sand soils to the depth investigated. The upper clay soils were generally characterized as moist with a medium stiff to stiff consistency, and were visually characterized as lean to fat clay with a medium to high plasticity. Liquid limit values of 41 and 55, and plasticity index values of 25 and 37 were obtained on the samples tested. The underlying variable sandy clay and clayey sand layers were characterized as having a low plasticity. Plasticity index values in these variable sand and clay layers ranged from 12 to 18 for the samples tested. The sand soils in the lower portions of the borings were characterized as fine to medium grained.

GROUNDWATER

Groundwater was not observed in the borings shortly after drilling. The water levels presented may not necessarily indicate where free water will be encountered during construction. Additional water may accumulate in borings or excavations left open for longer periods. Groundwater levels may also fluctuate several feet depending on climatic conditions, time of year, surface runoff, water levels in nearby streams, and other factors beyond the scope of this report.

ANALYSIS AND RECOMMENDATIONS

Geotechnical recommendations based on the proposed construction and subsurface conditions encountered in the borings at the locations and times indicated are presented in the following sections. The recommendations are based on an interpretation of the project site conditions from the information obtained in the exploratory borings. Adjustments to these recommendations may be required if the proposed construction changes, or subsurface conditions are encountered other than described in this report.

POND CONSTRUCTION

Exploratory boring results indicate subsurface conditions consist of a variable thickness layer of medium to high plasticity clay overlying variable mixtures of sand and clay soils. Depending on the intended use of the pond and the pond bottom elevation, a compacted clay liner may be required to maintain a relatively static water level due to the variable soils at this site. Typically, a 12 inch thick compacted clay liner is sufficient to adequately seal the ponds for seepage rates on the order of ¼ inch per day. The upper on-site clay soils with a plasticity index value in excess of 25 may be suitable for a clay liner. However, the soils are variable and separating the suitable clays from the unsuitable materials may be difficult. Bentonite amended soil may also be used to seal the ponds in lieu of a compacted clay liner. Typically, an 8 inch layer of soil amended with 4 to 6 percent bentonite is sufficient to provide seepage rates of ¼ inch per day or less. The actual application rate will need to be determined by testing during construction.

ENGINEERED FILL

All new engineered fill should be placed under controlled conditions with observation and testing by a qualified testing firm under the direction of a Professional Engineer. We recommend the pond liner material be compacted to a minimum of 95 percent of Standard Proctor (ASTM D-698). Liner fill materials consisting of fat and lean clays (CH, CL) should be placed from minus 2 to plus 4 percent of optimum moisture content. All fill material should be placed with a maximum compacted lift thickness of 6 inches. Smaller lift thickness may be necessary for energy sensitive soils (i.e. clay) or if light compaction equipment is used. Moisture sensitive soils (i.e. silt) may require stricter moisture control to achieve the required compaction.

GENERAL NOTES AND LIMITATIONS

Geotechnical recommendations are based on periodic sampling in widely spaced, small diameter borings. Subsurface conditions may vary from those encountered in the borings. This may require engineering judgment and adjustments to the geotechnical recommendations during construction. A Geotechnical Engineer should be retained for the construction monitoring to assure subsurface conditions are similar or the required adjustments are made.

The conclusions and recommendations presented are based on the data obtained from the borings at the locations indicated. No other warrantees or guarantees are intended. The nature and extent of subsurface conditions may vary across the site. If subsurface conditions are encountered other than described in this report, the recommendations presented may need to be re-evaluated and adjusted.

Prepared by,

Allied Laboratories
Department of Professional Engineering Consultants, P. A.

Steven M. Herman, P.E.
Geotechnical Division Manager

attachments

ALLIED LABORATORIES
DEPT. OF PEC, P.A.
350 SOUTH WASHINGTON
WICHITA, KANSAS

APPENDIX

FIELD EXPLORATION AND LABORATORY TEST RESULTS

NEW MARKET SQUARE OFFICE COMPLEX POND
WEST 29TH STREET NORTH
WICHITA, KANSAS

Allied Project No: 74-10553-147

ALLIED LABORATORIES
DEPT. OF PEC, P.A.
350 SOUTH WASHINGTON
WICHITA, KANSAS

BORING LOCATION SKETCH

NEW MARKET SQUARE OFFICE COMPLEX POND – W 29TH ST N – WICHITA, KANSAS
ALLIED PROJECT NO: 74-10471-147

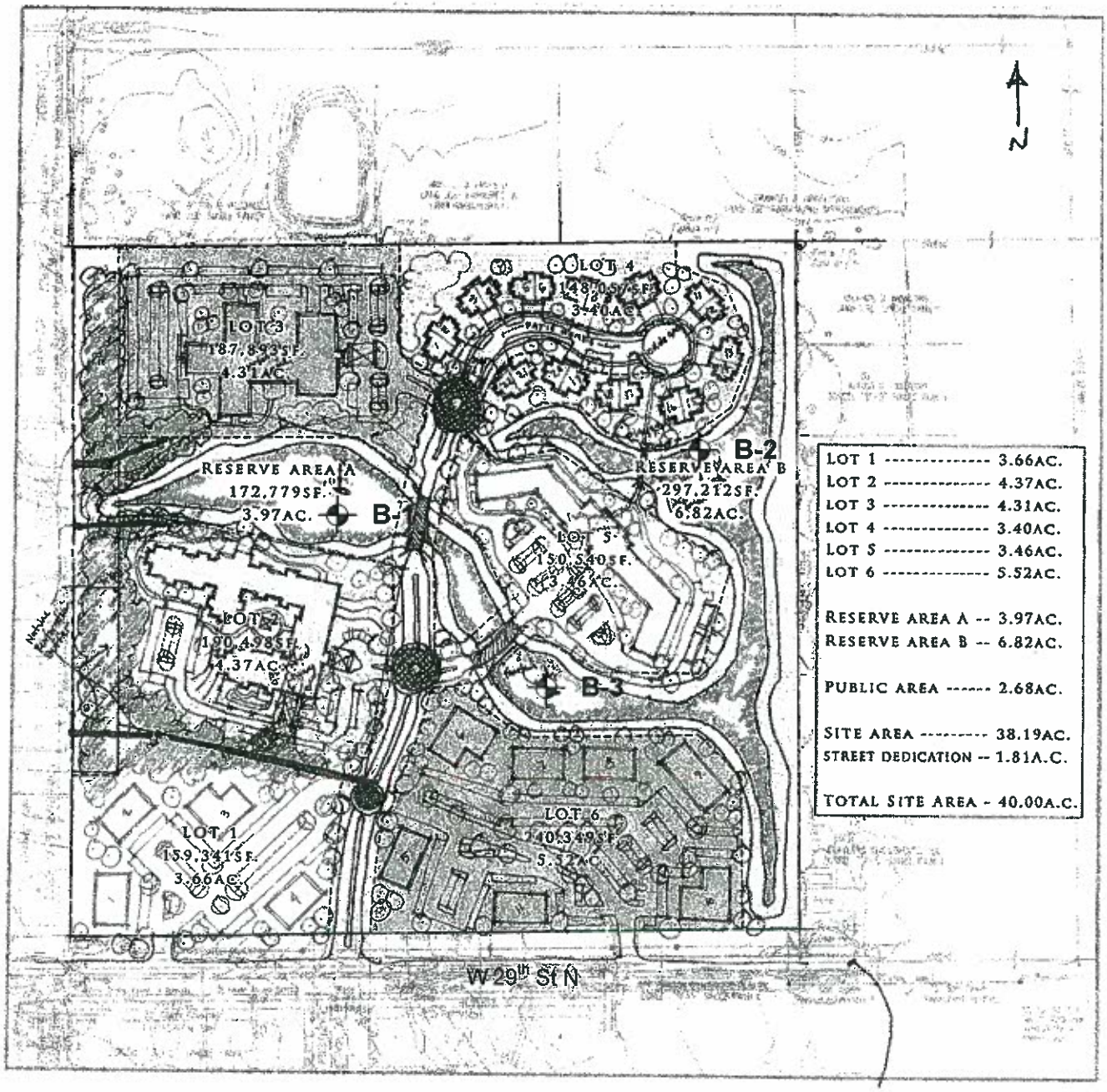
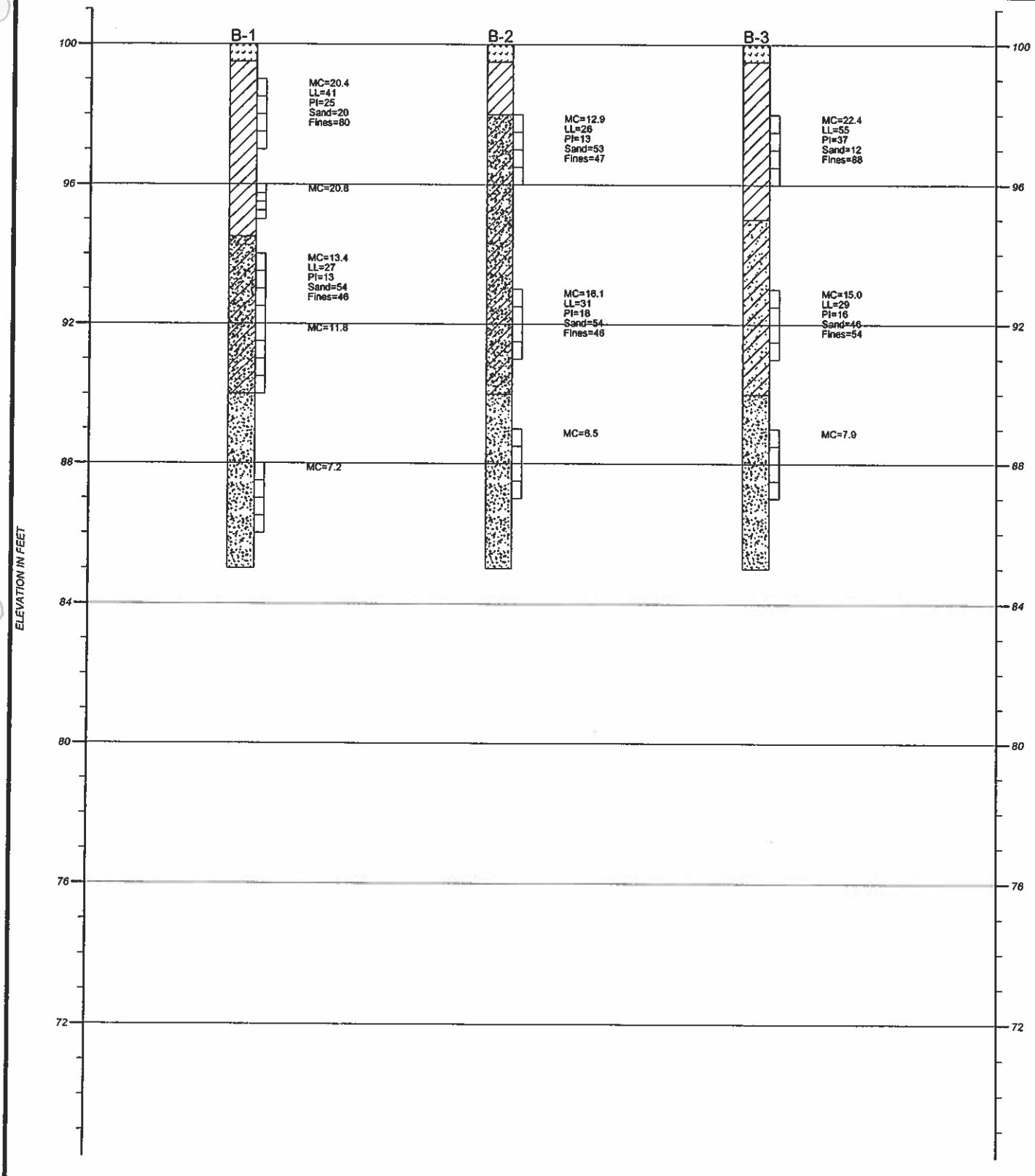


Figure 1

Allied Laboratories
Dept. of PEC
350 South Washington
Wichita, Kansas 67202

SUMMARY OF EXPLORATORY BORINGS

NEW MARKET SQUARE OFFICE COMPLEX POND - W 29TH ST N - WICHITA, KANSAS



Strata symbols

- Topsoil
- Clay: medium to high plasticity
- Clayey sand
- Sand: poorly graded
- Sandy Clay

Soil Samplers

- (G) Grab sample from auger cuttings

Figure 2

Allied Laboratories
Dept. of PEC, P.A.
350 South Washington
Wichita, Kansas 67202

EXPLORATORY BORING LOG

B-1

NEW MARKET SQUARE OFFICE COMPLEX POND - W 29TH ST N - WICHITA, KANSAS

PROJECT NO: **74-10553-147** | BORING LOCATION: **see boring location sketch**

SCALE: 1 IN= 4 FT. | BORING DATE 1/7/11 | DRILLER **kjp** | LOGGED BY **jlv** | CHECKED BY **smh**

WATER LEVEL @ DRILL: **dry** | 24 HOUR WATER LEVEL: | 72 HOUR WATER LEVEL:

LOG	Elev.	MATERIAL DESCRIPTION	Sym.	No.	Type	SPT	N Value	% Moist.	D. Den. (pcf)	Unconf. Qu(psf)	P.Pen (tsf)	% Fines	Liquid Limit	Plast. Index
0	100	TOPSOIL: brown, moist, roots/organics												
	99.5	CLAY: brown to reddish-brown, moist, medium stiff ... with sand to sandy		1-1	G			20.4				80	41	25
4				1-2	G			20.8						
	94.5	CLAYEY SAND: reddish-brown, moist, loose, fine grained		1-3	G			13.4				46	26	12
8				1-4	G			11.8						
	90	SAND: reddish-brown to tan, moist, loose, fine to medium grained, trace clay		1-5	G			7.2						
12														
	85	End of boring at 15 feet.												
16														
20														
24														
28														

NOTE: This information only pertains to this boring at the time of drilling and may not be indicative of entire site.

Figure 3

Allied Laboratories
Dept. of PEC, P.A.
350 South Washington
Wichita, Kansas 67202

EXPLORATORY BORING LOG

B-2

NEW MARKET SQUARE OFFICE COMPLEX POND - W 29TH ST N - WICHITA, KANSAS

PROJECT NO: **74-10553-147** | BORING LOCATION: **see boring location sketch**

SCALE: 1 IN= 4 FT. | BORING DATE **1/7/11** | DRILLER **kjp** | LOGGED BY **jlv** | CHECKED BY **smh**

WATER LEVEL @ DRILL: **dry** | 24 HOUR WATER LEVEL: | 72 HOUR WATER LEVEL:

LOG	Elev.	MATERIAL DESCRIPTION	Sym.	No.	Type	SPT	N Value	% Moist.	D. Den. (pcf)	Unconf. Qu(psf)	P. Pen (tsf)	% Fines	Liquid Limit	Plast. Index
0	100	TOPSOIL: brown, moist, roots/organics												
	99.5	CLAY: brown to reddish-brown, moist, medium stiff, with sand to sandy												
4	98	CLAYEY SAND: reddish-brown, moist, loose, fine grained		2-1	G			12.9				47	27	14
8				2-2	G			16.1				46	31	18
	90	SAND: reddish-brown, moist, loose, fine to medium grained, trace clay												
12				2-3	G			6.5						
	85	End of boring at 15 feet.												
16														
20														
24														
28														

NOTE: This information only pertains to this boring at the time of drilling and may not be indicative of entire site.

Figure 4

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350 South Washington
Wichita, Kansas 67202

EXPLORATORY BORING LOG

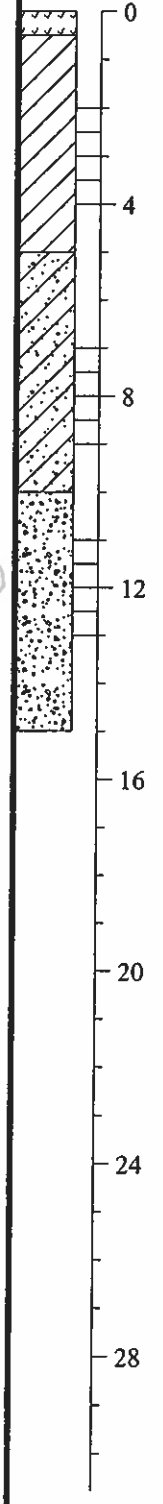
B-3

NEW MARKET SQUARE OFFICE COMPLEX POND - W 29TH ST N - WICHITA, KANSAS

PROJECT NO: **74-10553-147** | BORING LOCATION: **see boring location sketch**

SCALE: 1 IN= 4 FT. | BORING DATE **1/7/10** | DRILLER **kjp** | LOGGED BY **jlv** | CHECKED BY **smh**

WATER LEVEL @ DRILL: **dry** | 24 HOUR WATER LEVEL: | 72 HOUR WATER LEVEL:



Elev.	MATERIAL DESCRIPTION	Sym.	No.	Type	SPT N Value	% Moist.	D. Den. (pcf)	Unconf. Qu(psf)	P. Pen (tsf)	% Fines	Liquid Limit	Plast. Index
100 99.5	TOPSOIL: brown, moist, roots/organics CLAY: dark brown, moist, medium stiff, with sand to sandy		3-1	G		22.4				88	55	37
95	SANDY CLAY: reddish-brown, moist, medium stiff		3-2	G		15.0				54	29	16
90	SAND: reddish-brown to tan, moist, loose, fine to medium grained, trace clay		3-3	G		7.9						
85	End of boring at 15 feet.											

NOTE: This information only pertains to this boring at the time of drilling and may not be indicative of entire site.

Figure 5

Allied Laboratories
Dept. of PEC, P.A.
350 South Washington
Wichita, Kansas 67202

EXPLORATORY BORING LEGEND

NEW MARKET SQUARE OFFICE COMPLEX POND - W 29TH ST N - WICHITA, KANSAS

Strata symbols


Topsoil


Clay: medium to high plasticity


Clayey sand


Sand: poorly graded


Sandy Clay

Soil Samplers


(G) Grab sample from auger cuttings

Notes:

Exploratory borings were drilled on the dates indicated on the boring logs. Borings were drilled with a Mobile Drill B-53 rotary drill rig using 6 inch continuous flight auger and/or 3-1/4 inch ID hollow stem auger.

Groundwater encountered during drilling is presented on the boring logs. The water levels presented are for the times indicated. The water levels are approximate. Water levels can fluctuate several feet due to factors beyond the scope of this study.

Boring locations were determined by the drilling crew referencing existing site features unless denoted otherwise in the Geotechnical Report. Boring locations obtained by the drilling crew are approximate.

Ground surface elevations were determined by the drilling crew using a level survey referencing a temporary benchmark unless denoted otherwise in the Geotechnical Report. Elevations obtained by the drilling crew are approximate.

The subsurface soils presented on the boring logs are approximate. The exploratory boring logs represent general subsurface conditions based on visual observation of auger cuttings and periodic sampling. Additional drilling, sampling, Petrographic analysis and other testing may indicate other soil and bedrock types, and soil/bedrock layers may be present which could not be identified with this type of investigation.

The boring logs present sharp transitions between the various soil types. However, transitions usually occur more gradually in the field. The depths to the transitions are approximate.

The data presented on the boring logs is subject to the conclusions, recommendations and limitations discussed in the Geotechnical Report. Additional information on the subsurface soil, bedrock, groundwater and other conditions may be included in the report which are not presented on the boring logs.

Allied Laboratories
DEPT. OF PEC, PA
350 South Washington
Wichita, Kansas 67202

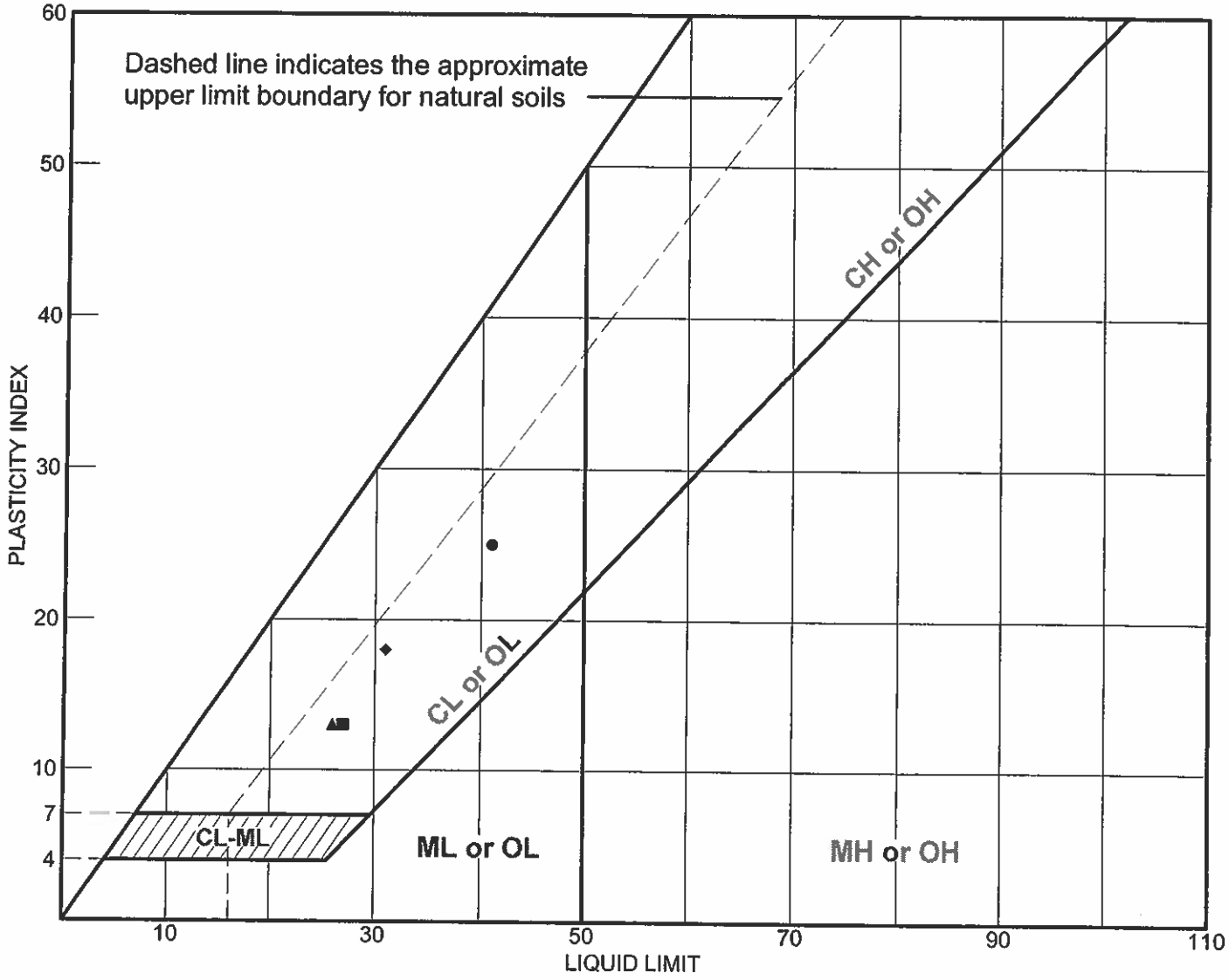
LABORATORY TEST SUMMARY

NEW MARKET SQUARE OFFICE COMPLEX POND - W 29TH ST N - WICHITA, KANSAS
74-10553-147

BORING	SAMP. NO.	DEPTH (feet)	N Value	MOIST %	DRY DEN (pcf)	UCC (psf)	LL	PL	PI	%Gravel	%Sand	%Fines
B-1												
	1-1	1.0		20.4			41	16	25		20	80
	1-2	4.0		20.8								
	1-3	6.0		13.4			27	14	13		54	46
	1-4	8.0		11.8								
	1-5	12.0		7.2								
B-2												
	2-1	2.0		12.9			26	13	13		53	47
	2-2	7.0		16.1			31	13	18		54	46
	2-3	11.0		6.5								
B-3												
	3-1	2.0		22.4			55	18	37		12	88
	3-2	7.0		15.0			29	13	16		46	54
	3-3	11.0		7.9								

Figure 7

LIQUID AND PLASTIC LIMITS TEST REPORT



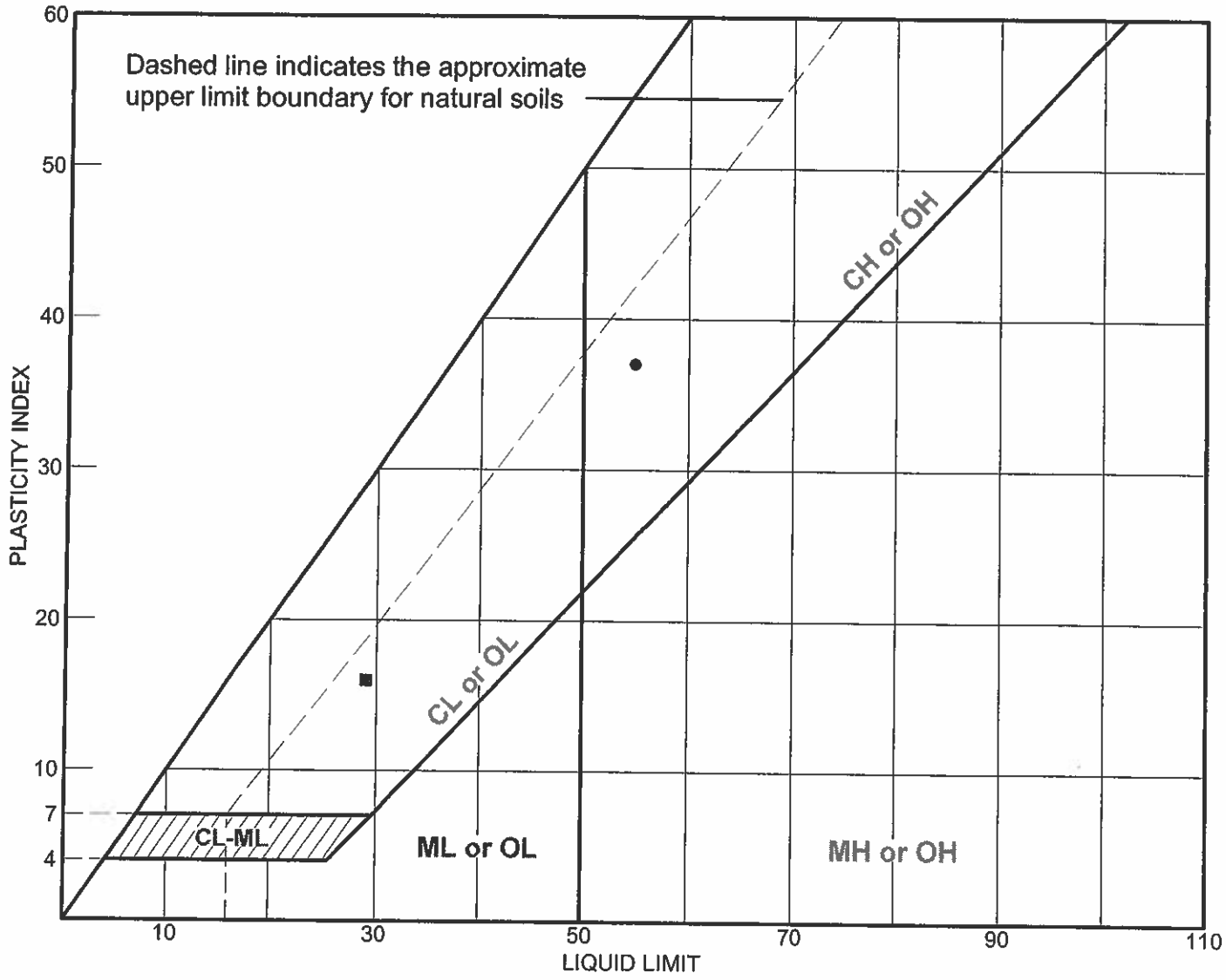
SOIL DATA								
SYMBOL	SOURCE	SAMPLE NO.	DEPTH (ft.)	NATURAL WATER CONTENT (%)	PLASTIC LIMIT (%)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	USCS
●	B-1	1-1	1.0	20.4	16	41	25	CL
■	B-1	1-3	6.0	13.4	14	27	13	CL
▲	B-2	2-1	2.0	12.9	13	26	13	CL
◆	B-2	2-2	7.0	16.1	13	31	18	CL

LIQUID AND PLASTIC LIMITS TEST REPORT
ALLIED LABORATORIES
Department of
PROFESSIONAL ENGINEERING CONSULTANTS

Client: Professional Engineering Consultants, P.A. - Wichita, Kansas
Project: NEW MARKET SQUARE OFFICE COMPLEX POND - W 29TH ST N - WICHITA, KANSAS
Project No.: 74-10553-147

Figure 8

LIQUID AND PLASTIC LIMITS TEST REPORT



SOIL DATA

SYMBOL	SOURCE	SAMPLE NO.	DEPTH (ft.)	NATURAL WATER CONTENT (%)	PLASTIC LIMIT (%)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	USCS
●	B-3	3-1	2.0	22.4	18	55	37	CH
■	B-3	3-2	7.0	15.0	13	29	16	CL

LIQUID AND PLASTIC LIMITS TEST REPORT **ALLIED LABORATORIES** **Department of** **PROFESSIONAL ENGINEERING CONSULTANTS**	**Client:** Professional Engineering Consultants, P.A. - Wichita, Kansas **Project:** NEW MARKET SQUARE OFFICE COMPLEX POND - W 29TH ST N - WICHITA, KANSAS **Project No.:** 74-10553-147 **Figure** 9

ALLIED LABORATORIES
DEPT. OF PEC, P.A.
350 SOUTH WASHINGTON
WICHITA, KANSAS

SOIL CLASSIFICATION CHART

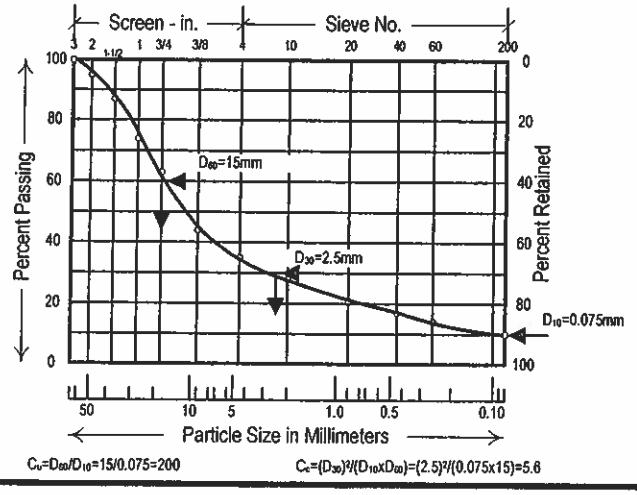
REFERENCE: ASTM D 2487
(Based on Unified Classification System)

Criteria for Assigning Group Symbols and Group Names Using Laboratory Tests[A]				Soil Classification	
				Group Symbol	Group Name[B]
Coarse-Grained Soils More than 50 % retained on No. 200 sieve.	**Gravels** More than 50 % coarse faction retained on No. 4 sieve.	Clean Gravels Less than 5% fines[C]	$Cu \geq 4$ and $1 \leq Cc \leq 3$ [E]	GW	Well graded gravel [F]
			$Cu < 4$ and\or $1 > Cc > 3$ [E]	GP	Poorly graded gravel [F]
		Gravels with fines More than 12% fines[C]	Fines Classify as ML or MH	GM	Silty gravel [F,G,H]
			Fines Classify as CL or CH	GC	Clayey gravel [F,G,H]
	Sands 50 % or more passes No. 4 sieve.	Clean Sands Less than 5% fines[D]	$Cu \geq 6$ and $1 \leq Cc \leq 3$ [E]	SW	Well graded sand [I]
			$Cu < 6$ and\or $1 > Cc > 3$ [E]	SP	Poorly graded sand [I]
		Sands with Fines More than 12% fines[D]	Fines Classify as ML and MH	SM	Silty sand [G,H,I]
			Fines Classify as CL and CH	SC	Clayey sand [G,H,I]
Fine Grained Soils 50 % or more passes No. 200 sieve.	**Silts and Clays** Liquid Limit less than 50.	Inorganic	PI>7 and plots on or above "A" line [J]	CL	Lean clay [K,L,M]
			PI<4 and plots on or below "A" line [J]	ML	Silt [K,L,M]
		Organic	Liquid Limit – oven dried / Liquid Limit – not dried ≤ 0.75	OL	Organic clay [K,L,M,N]
					Organic silt [K,L,M]
	Silts and Clays Liquid Limit of 50 or more.	Inorganic	PI plots on or above "A" Line	CH	Fat clay [K,L,M]
			PI plots below "A" Line	MH	Elastic silt [K,L,M]
		Organic	Liquid Limit – oven dried / Liquid Limit – not dried ≤ 0.75	OH	Organic clay [K,L,M,P]
					Organic silt [K,L,M,Q]
Highly organic soils	Primarily organic matter, dark in color, and organic odor			Pt	Peat

[A] Based on the material passing the 3-in. (75-mm) sieve.
[B] If field sample contained cobbles or boulders, or both add "with cobbles or boulders, or both" to group name.
[C] Gravels with 5 to 12% fines require dual symbols:
GW-GM Well graded gravel with silt.
GW-GC Well graded gravel with clay.
GP-GM Poorly graded gravel with silt.
GP-GC Poorly graded gravel with clay.
[D] Sands with 5 to 12% fines require dual symbols:
SW-SM Well graded sand with silt.
SW-SC Well graded sand with clay.
SP-SM Poorly graded sand with silt.
SP-SC Poorly graded sand with clay.

[E] $Cu = D_{60}/D_{10}$; $Cc = (D_{30})2 / (D_{10} \times D_{60})$.
[F] If soil contains $\geq$ 15% sand, add "with sand" to group name.
[G] If fines classify as CL-ML, use dual symbol GC-GM, or SC-SM.
[H] If fines are organic, add "with organic fines" to group name.
[I] If soil contains $\geq$ 15% gravel, add "with gravel" to group name.
[J] If Atterberg limits plot in hatched area, soil is a CL-ML silty clay.
[K] If soil contains 15 to 29% plus No. 200, add "with sand" or "with gravel" to group name.
[L] If soil contains $\geq$ 30% plus No. 200, predominately sand, add "sandy" to group name.
[M] If soil contains $\geq$ 30% plus No. 4, predominately gravel, add "gravely" to group name.
[N] PI $\geq$ 4 and plots on or above "A" line.
[O] PI < 4 or plots below "A" line.
[P] PI plots on or above "A" line.
[Q] PI plots below "A" line.

SIEVE ANALYSIS



$C_u = D_{60}/D_{10} = 15/0.075 = 200$ $C_c = (D_{30})^2/(D_{10} \times D_{60}) = (2.5)^2/(0.075 \times 15) = 5.6$

PLASTICITY CHART

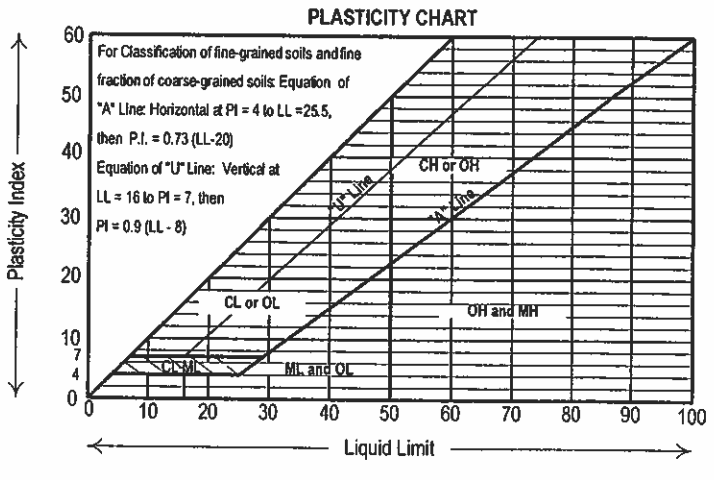


Figure 10

United States Department of Agriculture

NRCS

Natural Resources Conservation Service

A product of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local participants

Custom Soil Resource Report for Sedgwick County, Kansas

January 30, 2011

Preface

Soil surveys contain information that affects land use planning in survey areas. They highlight soil limitations that affect various land uses and provide information about the properties of the soils in the survey areas. Soil surveys are designed for many different users, including farmers, ranchers, foresters, agronomists, urban planners, community officials, engineers, developers, builders, and home buyers. Also, conservationists, teachers, students, and specialists in recreation, waste disposal, and pollution control can use the surveys to help them understand, protect, or enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. Soil surveys identify soil properties that are used in making various land use or land treatment decisions. The information is intended to help the land users identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Although soil survey information can be used for general farm, local, and wider area planning, onsite investigation is needed to supplement this information in some cases. Examples include soil quality assessments (http://soils.usda.gov/sqi/) and certain conservation and engineering applications. For more detailed information, contact your local USDA Service Center (http://offices.sc.egov.usda.gov/locator/app?agency=nrcs) or your NRCS State Soil Scientist (http://soils.usda.gov/contact/state_offices/).

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

The National Cooperative Soil Survey is a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (NRCS) has leadership for the Federal part of the National Cooperative Soil Survey.

Information about soils is updated periodically. Updated information is available through the NRCS Soil Data Mart Web site or the NRCS Web Soil Survey. The Soil Data Mart is the data storage site for the official soil survey information.

The U.S. Department of Agriculture (USDA) prohibits discrimination in all its programs and activities on the basis of race, color, national origin, age, disability, and where applicable, sex, marital status, familial status, parental status, religion, sexual orientation, genetic information, political beliefs, reprisal, or because all or a part of an individual's income is derived from any public assistance program. (Not all prohibited bases apply to all programs.) Persons with disabilities who require alternative means

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Contents

How Soil Surveys Are Made

Soil surveys are made to provide information about the soils and miscellaneous areas in a specific area. They include a description of the soils and miscellaneous areas and their location on the landscape and tables that show soil properties and limitations affecting various uses. Soil scientists observed the steepness, length, and shape of the slopes; the general pattern of drainage; the kinds of crops and native plants; and the kinds of bedrock. They observed and described many soil profiles. A soil profile is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed or from the surface down to bedrock. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

Currently, soils are mapped according to the boundaries of major land resource areas (MLRAs). MLRAs are geographically associated land resource units that share common characteristics related to physiography, geology, climate, water resources, soils, biological resources, and land uses (USDA, 2006). Soil survey areas typically consist of parts of one or more MLRA.

The soils and miscellaneous areas in a survey area occur in an orderly pattern that is related to the geology, landforms, relief, climate, and natural vegetation of the area. Each kind of soil and miscellaneous area is associated with a particular kind of landform or with a segment of the landform. By observing the soils and miscellaneous areas in the survey area and relating their position to specific segments of the landform, a soil scientist develops a concept, or model, of how they were formed. Thus, during mapping, this model enables the soil scientist to predict with a considerable degree of accuracy the kind of soil or miscellaneous area at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-vegetation-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. Soil taxonomy, the system of taxonomic classification used in the United States, is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil scientists classified and named the soils in the survey area, they compared the

individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

The objective of soil mapping is not to delineate pure map unit components; the objective is to separate the landscape into landforms or landform segments that have similar use and management requirements. Each map unit is defined by a unique combination of soil components and/or miscellaneous areas in predictable proportions. Some components may be highly contrasting to the other components of the map unit. The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The delineation of such landforms and landform segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, onsite investigation is needed to define and locate the soils and miscellaneous areas.

Soil scientists make many field observations in the process of producing a soil map. The frequency of observation is dependent upon several factors, including scale of mapping, intensity of mapping, design of map units, complexity of the landscape, and experience of the soil scientist. Observations are made to test and refine the soil-landscape model and predictions and to verify the classification of the soils at specific locations. Once the soil-landscape model is refined, a significantly smaller number of measurements of individual soil properties are made and recorded. These measurements may include field measurements, such as those for color, depth to bedrock, and texture, and laboratory measurements, such as those for content of sand, silt, clay, salt, and other components. Properties of each soil typically vary from one point to another across the landscape.

Observations for map unit components are aggregated to develop ranges of characteristics for the components. The aggregated values are presented. Direct measurements do not exist for every property presented for every map unit component. Values for some properties are estimated from combinations of other properties.

While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpret the data from these analyses and tests as well as the field-observed characteristics and the soil properties to determine the expected behavior of the soils under different uses. Interpretations for all of the soils are field tested through observation of the soils in different uses and under different levels of management. Some interpretations are modified to fit local conditions, and some new interpretations are developed to meet local needs. Data are assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management are assembled from farm records and from field or plot experiments on the same kinds of soil.

Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree of accuracy that a given soil will have a high water table within certain depths in most years, but they cannot predict that a high water table will always be at a specific level in the soil on a specific date.

After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

Soil Map

The soil map section includes the soil map for the defined area of interest, a list of soil map units on the map and extent of each map unit, and cartographic symbols displayed on the map. Also presented are various metadata about data used to produce the map, and a description of each soil map unit.

Custom Soil Resource Report
Soil Map

Map Scale: 1:3,750 if printed on A size (8.5" x 11") sheet.

N

Meters
0 50 100 200 300

Feet
0 200 400 800 1,200

MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils
- Soil Map Units

Special Point Features
- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other

Special Line Features
- Gully
- Short Steep Slope
- Other

Political Features
- Cities

Water Features
- Oceans
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

MAP INFORMATION

Map Scale: 1:3,750 if printed on A size (8.5" × 11") sheet.

The soil surveys that comprise your AOI were mapped at 1:24,000.

Please rely on the bar scale on each map sheet for accurate map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL: http://websoilsurvey.nrcs.usda.gov
Coordinate System: UTM Zone 14N NAD83

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Sedgwick County, Kansas
Survey Area Data: Version 7, Nov 30, 2010

Date(s) aerial images were photographed: 7/1/2006

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Sedgwick County, Kansas (KS173)			
Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
5956	Shellabarger sandy loam, 1 to 3 percent slopes	9.0	19.6%
5976	Vanoss silt loam, 0 to 1 percent slopes	11.1	24.3%
5977	Vanoss silt loam, 1 to 3 percent slopes	11.0	23.9%
6254	Waurika silt loam, 0 to 1 percent slopes	14.8	32.2%
Totals for Area of Interest		**45.9**	**100.0%**

Map Unit Descriptions

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If

intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

Sedgwick County, Kansas

5956—Shellabarger sandy loam, 1 to 3 percent slopes

Map Unit Setting

Elevation: 750 to 1,750 feet
Mean annual precipitation: 24 to 31 inches
Mean annual air temperature: 45 to 66 degrees F
Frost-free period: 195 to 225 days

Map Unit Composition

Shellabarger and similar soils: 100 percent
Minor components: 0 percent

Description of Shellabarger

Setting

Landform: Paleoterraces
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Loamy alluvium

Properties and qualities

Slope: 1 to 3 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 2.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water capacity: Moderate (about 8.9 inches)

Interpretive groups

Land capability (nonirrigated): 2e
Ecological site: Sandy (PE 17-20) (R079XY022KS)

Typical profile

0 to 15 inches: Sandy loam
15 to 40 inches: Sandy clay loam
40 to 60 inches: Sandy loam

Minor Components

Aquolls

Percent of map unit: 0 percent
Landform: Depressions, drainageways, hillslopes
Down-slope shape: Concave
Across-slope shape: Concave

5976—Vanoss silt loam, 0 to 1 percent slopes

Map Unit Setting

Elevation: 700 to 1,200 feet
Mean annual precipitation: 24 to 31 inches
Mean annual air temperature: 45 to 66 degrees F
Frost-free period: 195 to 225 days

Map Unit Composition

Vanoss and similar soils: 100 percent
Minor components: 0 percent

Description of Vanoss

Setting

Landform: Paleoterraces
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Alluvium

Properties and qualities

Slope: 0 to 1 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 2.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water capacity: High (about 11.5 inches)

Interpretive groups

Land capability (nonirrigated): 1
Ecological site: Loamy Upland (PE 17-20) (R079XY015KS)

Typical profile

0 to 13 inches: Silt loam
13 to 16 inches: Silty clay loam
16 to 60 inches: Silty clay loam

Minor Components

Aquolls

Percent of map unit: 0 percent
Landform: Depressions, drainageways, hillslopes
Down-slope shape: Concave
Across-slope shape: Concave

5977—Vanoss silt loam, 1 to 3 percent slopes

Map Unit Setting

Elevation: 700 to 1,200 feet
Mean annual precipitation: 24 to 31 inches
Mean annual air temperature: 45 to 66 degrees F
Frost-free period: 190 to 210 days

Map Unit Composition

Vanoss and similar soils: 100 percent
Minor components: 0 percent

Description of Vanoss

Setting

Landform: Paleoterraces
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Alluvium

Properties and qualities

Slope: 1 to 3 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 2.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water capacity: High (about 11.5 inches)

Interpretive groups

Land capability (nonirrigated): 2e
Ecological site: Loamy Upland (PE 17-20) (R079XY015KS)

Typical profile

0 to 13 inches: Silt loam
13 to 16 inches: Silty clay loam
16 to 60 inches: Silty clay loam

Minor Components

Aquolls

Percent of map unit: 0 percent
Landform: Depressions, drainageways, hillslopes
Down-slope shape: Concave
Across-slope shape: Concave

6254—Waurika silt loam, 0 to 1 percent slopes

Map Unit Setting

Elevation: 1,000 to 1,300 feet
Mean annual precipitation: 24 to 31 inches
Mean annual air temperature: 45 to 66 degrees F
Frost-free period: 195 to 225 days

Map Unit Composition

Waurika and similar soils: 100 percent
Minor components: 0 percent

Description of Waurika

Setting

Landform: Depressions on paleoterraces
Down-slope shape: Linear, concave
Across-slope shape: Linear, concave
Parent material: Old clayey alluvium and/or residuum weathered from shale

Properties and qualities

Slope: 0 to 1 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Somewhat poorly drained
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.06 in/hr)
Depth to water table: About 6 to 12 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline to slightly saline (0.0 to 8.0 mmhos/cm)
Available water capacity: High (about 9.3 inches)

Interpretive groups

Land capability (nonirrigated): 2w
Ecological site: Clay Upland (PE 24-32) (R080AY007KS)

Typical profile

0 to 10 inches: Silt loam
10 to 15 inches: Silt loam
15 to 40 inches: Silty clay
40 to 53 inches: Silty clay
53 to 60 inches: Silty clay loam

Minor Components

Aquolls

Percent of map unit: 0 percent
Landform: Depressions, drainageways
Down-slope shape: Concave
Across-slope shape: Concave

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Project: NewMarket Office
Simulation Run: 2yr-24hr Subbasin: WN-2pre

Start of Run:	15Apr2006, 12:00	Basin Model:	Basin 1
End of Run:	22Apr2006, 20:00	Meteorologic Model:	2yr-24hr
Compute Time:	01Feb2011, 11:49:43	Control Specifications:	Control 1

Volume Units: IN

Computed Results

Peak Discharge :	35.6 (CFS)	Date/Time of Peak Discharge :	16Apr2006, 00:15
Total Precipitation :	3.50 (IN)	Total Direct Runoff :	1.65 (IN)
Total Loss :	1.85 (IN)	Total Baseflow :	0.00 (IN)
Total Excess :	1.65 (IN)	Discharge :	1.65 (IN)

Project: NewMarket Office
Simulation Run: 2yr-24hr Subbasin: WN-3

Start of Run:	15Apr2006, 12:00	Basin Model:	Basin 1
End of Run:	22Apr2006, 20:00	Meteorologic Model:	2yr-24hr
Compute Time:	01Feb2011, 11:49:43	Control Specifications:	Control 1

Volume Units: IN

Computed Results

Peak Discharge :	33.7 (CFS)	Date/Time of Peak Discharge :	16Apr2006, 00:00
Total Precipitation :	3.50 (IN)	Total Direct Runoff :	2.93 (IN)
Total Loss :	0.57 (IN)	Total Baseflow :	0.00 (IN)
Total Excess :	2.93 (IN)	Discharge :	2.93 (IN)

Project: NewMarket Office
Simulation Run: 2yr-24hr Reservoir: WN-P1

Start of Run:	15Apr2006, 12:00	Basin Model:	Basin 1
End of Run:	22Apr2006, 20:00	Meteorologic Model:	2yr-24hr
Compute Time:	01Feb2011, 11:49:43	Control Specifications:	Control 1

Volume Units: IN

Computed Results

Peak Inflow :	23.0 (CFS)	Date/Time of Peak Inflow :	16Apr2006, 00:30
Peak Outflow :	15.1 (CFS)	Date/Time of Peak Outflow :	16Apr2006, 01:15
Total Inflow :	1.58 (IN)	Peak Storage :	4.3 (AC-FT)
Total Outflow :	0.93 (IN)	Peak Elevation :	1355.4 (FT)

Project: NewMarket Office
Simulation Run: 2yr-24hr Reservoir: WF-P4

Start of Run:	15Apr2006, 12:00	Basin Model:	Basin 1
End of Run:	22Apr2006, 20:00	Meteorologic Model:	2yr-24hr
Compute Time:	01Feb2011, 11:49:43	Control Specifications:	Control 1

Volume Units: IN

Computed Results

Peak Inflow :	111.3 (CFS)	Date/Time of Peak Inflow :	16Apr2006, 00:45
Peak Outflow :	68.7 (CFS)	Date/Time of Peak Outflow :	16Apr2006, 01:45
Total Inflow :	1.54 (IN)	Peak Storage :	47.3 (AC-FT)
Total Outflow :	1.54 (IN)	Peak Elevation :	1354.6 (FT)

Project: NewMarket Office
Simulation Run: 5YR-24HR Subbasin: WN-2pre

Start of Run:	15Apr2006, 12:00	Basin Model:	Basin 1
End of Run:	22Apr2006, 20:00	Meteorologic Model:	5YR-24HR
Compute Time:	01Feb2011, 11:54:16	Control Specifications:	Control 1

Volume Units: IN

Computed Results

Peak Discharge :	53.0 (CFS)	Date/Time of Peak Discharge :	16Apr2006, 00:15
Total Precipitation :	4.50 (IN)	Total Direct Runoff :	2.44 (IN)
Total Loss :	2.06 (IN)	Total Baseflow :	0.00 (IN)
Total Excess :	2.44 (IN)	Discharge :	2.44 (IN)

Project: NewMarket Office
Simulation Run: 5YR-24HR Subbasin: WN-3

Start of Run:	15Apr2006, 12:00	Basin Model:	Basin 1
End of Run:	22Apr2006, 20:00	Meteorologic Model:	5YR-24HR
Compute Time:	01Feb2011, 15:28:58	Control Specifications:	Control 1

Volume Units: IN

Computed Results

Peak Discharge :	44.1 (CFS)	Date/Time of Peak Discharge :	16Apr2006, 00:00
Total Precipitation :	4.50 (IN)	Total Direct Runoff :	3.92 (IN)
Total Loss :	0.58 (IN)	Total Baseflow :	0.00 (IN)
Total Excess :	3.92 (IN)	Discharge :	3.92 (IN)

Project: NewMarket Office
Simulation Run: 5YR-24HR Reservoir: WN-P1

Start of Run:	15Apr2006, 12:00	Basin Model:	Basin 1
End of Run:	22Apr2006, 20:00	Meteorologic Model:	5YR-24HR
Compute Time:	01Feb2011, 11:54:16	Control Specifications:	Control 1

Volume Units: IN

Computed Results

Peak Inflow :	35.2 (CFS)	Date/Time of Peak Inflow :	16Apr2006, 00:30
Peak Outflow :	34.0 (CFS)	Date/Time of Peak Outflow :	16Apr2006, 00:45
Total Inflow :	2.32 (IN)	Peak Storage :	4.4 (AC-FT)
Total Outflow :	1.65 (IN)	Peak Elevation :	1355.5 (FT)

Project: NewMarket Office
Simulation Run: 5YR-24HR Reservoir: WF-P4

Start of Run:	15Apr2006, 12:00	Basin Model:	Basin 1
End of Run:	22Apr2006, 20:00	Meteorologic Model:	5YR-24HR
Compute Time:	01Feb2011, 11:54:16	Control Specifications:	Control 1

Volume Units: IN

Computed Results

Peak Inflow :	167.5 (CFS)	Date/Time of Peak Inflow :	16Apr2006, 00:45
Peak Outflow :	108.9 (CFS)	Date/Time of Peak Outflow :	16Apr2006, 01:45
Total Inflow :	2.29 (IN)	Peak Storage :	50.9 (AC-FT)
Total Outflow :	2.28 (IN)	Peak Elevation :	1355.1 (FT)

Project: NewMarket Office
Simulation Run: 10YR-24HR Subbasin: WN-2pre

Start of Run:	15Apr2006, 12:00	Basin Model:	Basin 1
End of Run:	22Apr2006, 20:00	Meteorologic Model:	10YR-24HR
Compute Time:	01Feb2011, 12:53:25	Control Specifications:	Control 1

Volume Units: IN

Computed Results

Peak Discharge :	66.0 (CFS)	Date/Time of Peak Discharge :	16Apr2006, 00:15
Total Precipitation :	5.20 (IN)	Total Direct Runoff :	3.02 (IN)
Total Loss :	2.18 (IN)	Total Baseflow :	0.00 (IN)
Total Excess :	3.02 (IN)	Discharge :	3.02 (IN)

Project: NewMarket Office
Simulation Run: 10YR-24HR Subbasin: WN-3

Start of Run:	15Apr2006, 12:00	Basin Model:	Basin 1
End of Run:	22Apr2006, 20:00	Meteorologic Model:	10YR-24HR
Compute Time:	01Feb2011, 12:53:25	Control Specifications:	Control 1

Volume Units: IN

Computed Results

Peak Discharge :	51.4 (CFS)	Date/Time of Peak Discharge :	16Apr2006, 00:00
Total Precipitation :	5.20 (IN)	Total Direct Runoff :	4.62 (IN)
Total Loss :	0.58 (IN)	Total Baseflow :	0.00 (IN)
Total Excess :	4.62 (IN)	Discharge :	4.62 (IN)

Project: NewMarket Office
Simulation Run: 10YR-24HR Reservoir: WN-P1

Start of Run:	15Apr2006, 12:00	Basin Model:	Basin 1
End of Run:	22Apr2006, 20:00	Meteorologic Model:	10YR-24HR
Compute Time:	01Feb2011, 12:53:25	Control Specifications:	Control 1

Volume Units: IN

Computed Results

Peak Inflow :	44.5 (CFS)	Date/Time of Peak Inflow :	16Apr2006, 00:30
Peak Outflow :	43.1 (CFS)	Date/Time of Peak Outflow :	16Apr2006, 00:45
Total Inflow :	2.88 (IN)	Peak Storage :	4.4 (AC-FT)
Total Outflow :	2.30 (IN)	Peak Elevation :	1355.5 (FT)

Project: NewMarket Office
Simulation Run: 10YR-24HR Reservoir: WF-P4

Start of Run:	15Apr2006, 12:00	Basin Model:	Basin 1
End of Run:	22Apr2006, 20:00	Meteorologic Model:	10YR-24HR
Compute Time:	01Feb2011, 12:53:25	Control Specifications:	Control 1

Volume Units: IN

Computed Results

Peak Inflow :	210.2 (CFS)	Date/Time of Peak Inflow :	16Apr2006, 00:45
Peak Outflow :	141.3 (CFS)	Date/Time of Peak Outflow :	16Apr2006, 01:45
Total Inflow :	2.85 (IN)	Peak Storage :	53.5 (AC-FT)
Total Outflow :	2.84 (IN)	Peak Elevation :	1355.4 (FT)

Project: NewMarket Office
Simulation Run: 25YR-24HR Subbasin: WN-2pre

Start of Run:	15Apr2006, 12:00	Basin Model:	Basin 1
End of Run:	22Apr2006, 20:00	Meteorologic Model:	25YR-24HR
Compute Time:	01Feb2011, 12:56:08	Control Specifications:	Control 1

Volume Units: IN

Computed Results

Peak Discharge :	83.2 (CFS)	Date/Time of Peak Discharge :	16Apr2006, 00:15
Total Precipitation :	6.10 (IN)	Total Direct Runoff :	3.79 (IN)
Total Loss :	2.31 (IN)	Total Baseflow :	0.00 (IN)
Total Excess :	3.79 (IN)	Discharge :	3.79 (IN)

Project: NewMarket Office
Simulation Run: 25YR-24HR Subbasin: WN-3

Start of Run:	15Apr2006, 12:00	Basin Model:	Basin 1
End of Run:	22Apr2006, 20:00	Meteorologic Model:	25YR-24HR
Compute Time:	01Feb2011, 12:56:08	Control Specifications:	Control 1

Volume Units: IN

Computed Results

Peak Discharge :	60.7 (CFS)	Date/Time of Peak Discharge :	16Apr2006, 00:00
Total Precipitation :	6.10 (IN)	Total Direct Runoff :	5.51 (IN)
Total Loss :	0.59 (IN)	Total Baseflow :	0.00 (IN)
Total Excess :	5.51 (IN)	Discharge :	5.51 (IN)

Project: NewMarket Office
Simulation Run: 25YR-24HR Reservoir: WN-P1

Start of Run:	15Apr2006, 12:00	Basin Model:	Basin 1
End of Run:	22Apr2006, 20:00	Meteorologic Model:	25YR-24HR
Compute Time:	01Feb2011, 12:56:08	Control Specifications:	Control 1

Volume Units: IN

Computed Results

Peak Inflow :	56.9 (CFS)	Date/Time of Peak Inflow :	16Apr2006, 00:30
Peak Outflow :	55.0 (CFS)	Date/Time of Peak Outflow :	16Apr2006, 00:45
Total Inflow :	3.62 (IN)	Peak Storage :	4.4 (AC-FT)
Total Outflow :	2.94 (IN)	Peak Elevation :	1355.5 (FT)

Project: NewMarket Office
Simulation Run: 25YR-24HR Reservoir: WF-P4

Start of Run:	15Apr2006, 12:00	Basin Model:	Basin 1
End of Run:	22Apr2006, 20:00	Meteorologic Model:	25YR-24HR
Compute Time:	01Feb2011, 12:56:08	Control Specifications:	Control 1

Volume Units: IN

Computed Results

Peak Inflow :	267.6 (CFS)	Date/Time of Peak Inflow :	16Apr2006, 00:45
Peak Outflow :	188.1 (CFS)	Date/Time of Peak Outflow :	16Apr2006, 01:45
Total Inflow :	3.59 (IN)	Peak Storage :	57.1 (AC-FT)
Total Outflow :	3.58 (IN)	Peak Elevation :	1355.8 (FT)

Project: NewMarket Office
Simulation Run: 100yr-24hr Subbasin: WN-2pre

Start of Run:	15Apr2006, 12:00	Basin Model:	Basin 1
End of Run:	22Apr2006, 20:00	Meteorologic Model:	100 yr. - 24 hrs.
Compute Time:	01Feb2011, 12:58:22	Control Specifications:	Control 1

Volume Units: IN

Computed Results

Peak Discharge :	116.8 (CFS)	Date/Time of Peak Discharge :	16Apr2006, 00:15
Total Precipitation :	7.80 (IN)	Total Direct Runoff :	5.31 (IN)
Total Loss :	2.49 (IN)	Total Baseflow :	0.00 (IN)
Total Excess :	5.31 (IN)	Discharge :	5.31 (IN)

Project: NewMarket Office
Simulation Run: 100yr-24hr Subbasin: WN-3

Start of Run:	15Apr2006, 12:00	Basin Model:	Basin 1
End of Run:	22Apr2006, 20:00	Meteorologic Model:	100 yr. - 24 hrs.
Compute Time:	01Feb2011, 12:58:22	Control Specifications:	Control 1

Volume Units: IN

Computed Results

Peak Discharge :	78.1 (CFS)	Date/Time of Peak Discharge :	16Apr2006, 00:00
Total Precipitation :	7.80 (IN)	Total Direct Runoff :	7.20 (IN)
Total Loss :	0.60 (IN)	Total Baseflow :	0.00 (IN)
Total Excess :	7.20 (IN)	Discharge :	7.20 (IN)

Project: NewMarket Office
Simulation Run: 100yr-24hr Reservoir: WN-P1

Start of Run:	15Apr2006, 12:00	Basin Model:	Basin 1
End of Run:	22Apr2006, 20:00	Meteorologic Model:	100 yr. - 24 hrs.
Compute Time:	01Feb2011, 12:58:22	Control Specifications:	Control 1

Volume Units: IN

Computed Results

Peak Inflow :	81.3 (CFS)	Date/Time of Peak Inflow :	16Apr2006, 00:30
Peak Outflow :	78.3 (CFS)	Date/Time of Peak Outflow :	16Apr2006, 00:45
Total Inflow :	5.10 (IN)	Peak Storage :	4.5 (AC-FT)
Total Outflow :	4.41 (IN)	Peak Elevation :	1355.6 (FT)

Project: NewMarket Office
Simulation Run: 100yr-24hr Reservoir: WF-P4

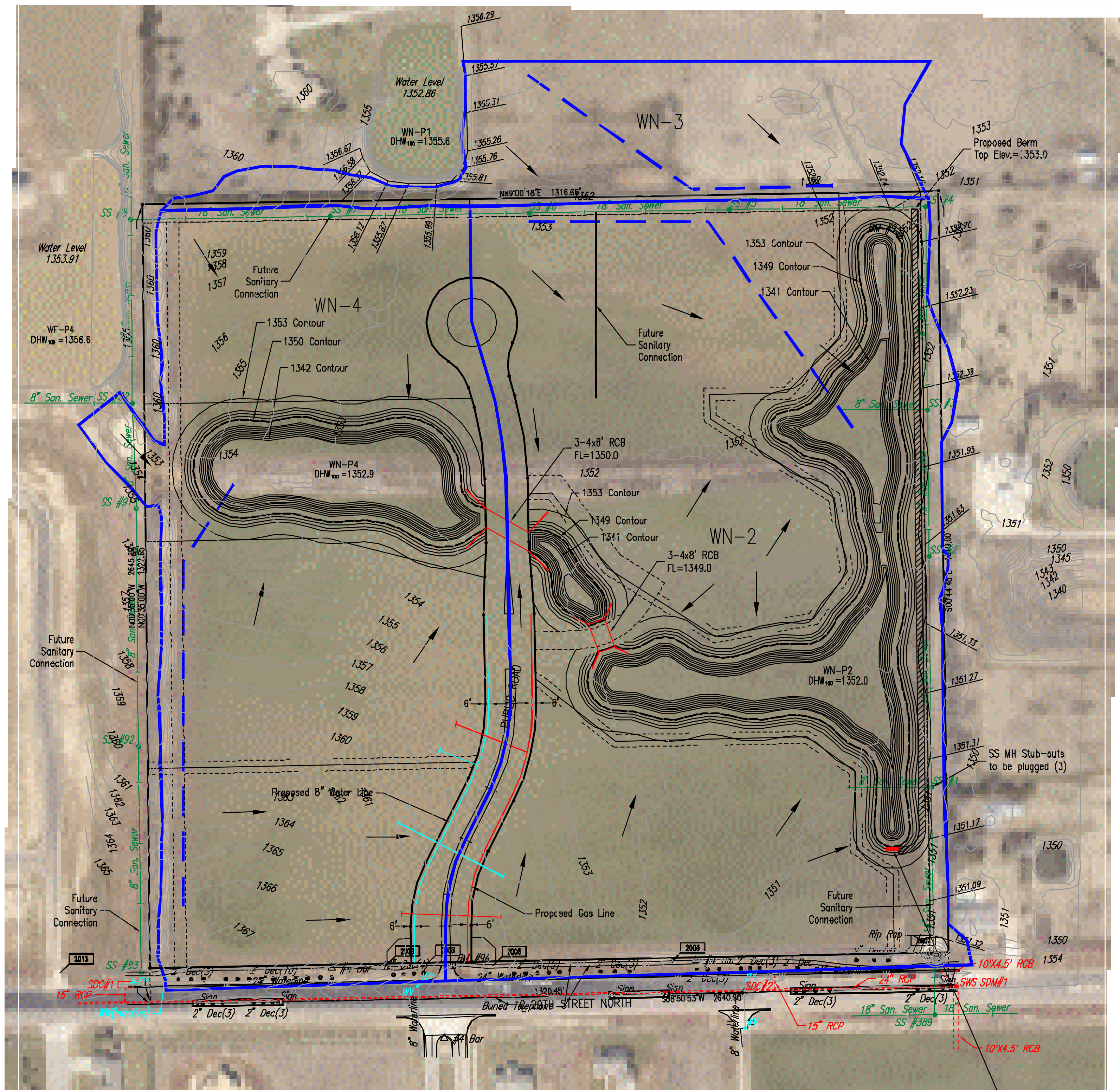
Start of Run:	15Apr2006, 12:00	Basin Model:	Basin 1
End of Run:	22Apr2006, 20:00	Meteorologic Model:	100 yr. - 24 hrs.
Compute Time:	01Feb2011, 12:58:22	Control Specifications:	Control 1

Volume Units: IN

Computed Results

Peak Inflow :	389.5 (CFS)	Date/Time of Peak Inflow :	16Apr2006, 01:00
Peak Outflow :	285.8 (CFS)	Date/Time of Peak Outflow :	16Apr2006, 01:45
Total Inflow :	5.07 (IN)	Peak Storage :	64.3 (AC-FT)
Total Outflow :	5.06 (IN)	Peak Elevation :	1356.6 (FT)

Tab 3
Post-Development Hydrologic Analysis



MAIN SPILLWAY TO BE A 20 L.F.
CONCRETE SPILLWAY AT ELEVATION 1349.0

SCALE: 1" = 100'

0 100 200

LEGEND

FLOW DIRECTION =

TC PATH =

DRAINAGE BASIN =

BENCHMARKS:

BM #9

T-POST 70' +/- WEST AND 75' SOUTH OF NORTHEAST CORNER SW 1/4 SE 1/4 SEC. 31, T26S, R1W

ELEV. 1351.58 NAVD 88

BM #9A

CHISELED SQUARE AT NORTHEAST CORNER OF CONCRETE DRIVE APPROACH, SOUTH SIDE OF SIDEWALK ON NORTH SIDE OF 29TH STREET, AT INTERSECTION OF 29TH AND PARKDALE.

ELEV. 1359.26 NAVD 88

STORM SEWER:

SDC #1
CURB INLET
TOP 1364.65
15" RCP (S) FL 1360.65

SDC #2
CURB INLET
TOP 1353.88
15" RCP (S) FL 1350.43

SDM #1
MANHOLE
TOP 1355.02
24" RCP (W) FL 1347.42

RCBC at 29th Street
10' WIDE X 4.5' HIGH
TOP OF HEADWALL 1355.26
FL 1347.56

ALL FUTURE SITE DEVELOPMENT WILL HAVE DRAINAGE INFRASTRUCTURE THAT WILL DISCHARGE INTO THE PROPOSED DETENTION LAKE.

WN-P2 STATIC LEVEL = 1349.0 (3.45 AC.)
DESIGN HIGH WATER = 1352.0 (100 YEAR)

WN-P4 STATIC LEVEL = 1350.0 (1.69 AC.)
DESIGN HIGH WATER = 1352.9 (100 YEAR)

OFFSITE, UPSTREAM AND DOWNSTREAM DRAINAGE IS ADDRESSED IN THE COMPREHENSIVE CADILLAC LAKE MODEL IN THE DRAINAGE REPORT. SEE NOTES WF-P4, WN-P1, AND WN-P2, AND EXPANDED DRAINAGE AREA MAP.

SITE SERVED BY EXISTING SANITARY SEWER ALONG THE PERIMETER. WATER AND NATURAL GAS SERVICE LINES ARE PROPOSED AS SHOWN ALONG THE INITIAL PUBLIC ROAD, FOR THE FIRST PHASE OF CONSTRUCTION.

DETAILED PROPOSED SITE GRADING TO BE DEVELOPED FOR INDIVIDUAL FUTURE SITES. MINIMUM BUILDING FINISH FLOOR PAD ELEVATIONS SHOWN RELATIVE TO DESIGN HIGH WATER.

SITE WATER QUALITY VOLUME ESTIMATED AT 3.20 AF. SEE DRAINAGE REPORT. WATER QUALITY VOLUME IS LESS THAN THE ESTIMATED PERMANENT POOL VOLUME OF 26.02 AF.

CHANNEL BANK PROTECTION VOLUME IS NOT APPLICABLE.

Table 2 – Water Quality Volume Calculations

Rv = Rvu*U + Rvd*D + Rvi*I			
Rv=0.20*10%+0.25*5%+0.95*85%	Rv=	0.84	
Area	A=	38.11	Acres
Rainfall	P=	1.20	Inches
Water Quality Volume = Rv*A*P/12	WQ Vol=	3.20	AC-FT
9.66 AC-FT + 16.36 AC-FT = 26.02 AC-FT			
26.02 AC-FT > 3.20 AC-FT			

Table 3 – Proposed Conditions Summary

				Peak Outflows by Storm Frequency (cfs)				
Basin/Pond	Area (AC)	Tc(min.)	CN	2 Year	5 Year	10 Year	25 Year	100 Year
WN-P1	35.60	67	70	15.1	34.0	43.1	55.0	78.3
WN-2 POST	21.62	15	96	61.9	81.1	94.5	111.5	143.6
WN-4 POST	16.47	15	96	47.2	61.9	72.0	85.1	109.5
WF-P4	170.0	104	68	68.7	108.9	141.3	188.1	265.8
WN-3	11.76	15	96	33.7	44.1	51.4	60.7	78.1
WN-P4	---	---	---	69.9	110.5	143.2	190.1	289.2
			POST TOTAL	249.3	330.0	402.3	500.4	695.3
			PRE TOTAL	153.1	240.0	301.8	387.0	559.0
WN-P2	---	---	---	78.6	124.0	160.8	210.5	317.3

Table 4A – Floodplain Storage
Pre-Development

Elevation (Feet)	Area (Acres)	Incr. Volume (Acre-Feet)	Floodplain Storage (Acre-Feet)
1350	0.00	0.00	0.00
1351	2.53	1.27	1.27
1352	12.26	7.40	8.66
1352.4	16.53	5.76	14.42
1353	22.94	11.84	26.26
4.60 AC-FT + 14.98 AC-FT = 19.58 AC-FT			
19.58 AC-FT >14.42 AC-FT			

Table 4B – Floodplain Storage
Post Development Pond WN-P4

Elevation (Feet)	Area (Acres)	Incr. Volume (Acre-Feet)	Total Volume (Acre-Feet)	Floodplain Storage (Acre-Feet)
1342	0.90	0.00	0.00	---
1343	0.97	0.94	0.94	---
1344	1.05	1.01	1.95	---
1345	1.12	1.08	3.03	---
1346	1.19	1.15	4.18	---
1347	1.27	1.23	5.41	---
1348	1.34	1.30	6.72	---
1349	1.42	1.38	8.10	---
1350	1.69	1.56	9.66	---
1351	1.92	1.81	11.46	1.81
1352	2.03	1.98	13.44	3.78
1352.4	2.08	0.82	14.26	4.60
1353	2.15	1.27	15.53	5.87

Table 4C – Floodplain Storage
Post Development Pond WN-P2

Elevation (Feet)	Area (Acres)	Incr. Volume (Acre-Feet)	Total Volume (Acre-Feet)	Floodplain Storage (Acre-Feet)
1341	1.11	0.00	0.00	---
1342	1.30	1.21	1.21	---
1343	1.55	1.43	2.63	---
1344	1.78	1.67	4.30	---
1345	2.01	1.90	6.20	---
1346	2.24	2.13	8.33	---
1347	2.48	2.36	10.69	---
1348	2.71	2.60	13.28	---
1349	3.45	3.08	16.36	---
1350	4.01	3.73	20.09	3.73
1351	4.58	4.30	24.39	8.03
1352	5.14	4.86	29.25	12.88
1352.4	5.36	2.10	31.35	14.98
1353	5.70	3.32	34.67	18.30

No.	Revision	By	Date

PROPOSED DRAINAGE PLAN
NEWMARKET OFFICE 2ND
WICHITA, KANSAS

Professional Engineering Consultants, P.A.
303 S. TOPEKA • WICHITA, KANSAS 67202
316-262-2691 • FAX 316-262-3003

Designed by	JEH	Job No.	10553	Sht. 1 of 1
Drawn by	AEE	Date	01/14/11	

Saved 02-03-2011 8:45:05 AM by BJS
Plot Scale 1:223.2558 02-03-2011 7:42:29 AM by GSG
Q:\2010\10553\Drainage Plans\10553 Proposed Drainage Plan

45TH STREET NORTH

37TH STREET NORTH

29TH STREET NORTH

21ST STREET NORTH

119TH STREET WEST

MAIZE ROAD

TYLER ROAD

BASIN WN-1
AREA = 228 AC

BASIN WP-1
AREA = 95 AC

BASIN WP-2
AREA = 33 AC

BASIN EW-1
AREA = 70 AC

BASIN WC-1
AREA = 212 AC

BASIN WF-4
AREA = 170 AC

BASIN EF-1
AREA = 461 AC

NOT IN BASIN
DRAINS EAST
BASIN E-FP3
AREA = 60 AC

BASIN WF-3
AREA = 30 AC

BASIN WN-1
AREA = 33.6 AC

BASIN WN-3
AREA = 11.8 AC

BASIN WN-4
AREA = 11.7 AC

BASIN WF-1
AREA = 165 AC

BASIN WF-5
AREA = 9 AC

BASIN WF-2
AREA = 32 AC

BASIN WF-6
AREA = 26 AC

BASIN WN-2
AREA = 35.1 AC

BASIN WE-1
AREA = 106 AC

DRAINS DIRECTLY
INTO CADILLAC LAKE
BASIN ER-1
AREA = 200 AC

BASIN ER-2
AREA = 125 AC

BASIN EC-2
AREA = 42 AC

BASIN EC-1
AREA = 110 AC

NOT IN BASIN
DRAINS SOUTH
BASIN WM-1
AREA = 197 AC

NOT IN BASIN
DRAINS SOUTH
BASIN EC-2
AREA = 49 AC

DRAINAGE BASIN
TOTAL AREA= 2293 ACRES
W/ MAIZE ROAD= 1200 ACRES
E/ MAIZE ROAD= 1104 ACRES

SCALE: 1"=600'

LEGEND

LAKES
DRAINAGE BASIN
MAIZE CITY LIMITS
WICHITA CITY LIMITS
DRAINAGE BASIN EXISTING

Professional Engineering Consultants, P.A.

CADILLAC LAKE DRAINAGE BASIN

TABLE 2 - WATER QUALITY VOLUME CALCULATIONS			
Rv=Rvu*U+Rvd*D+Rvi*I			
RV=0.20*10%+0.25*5%+0.95*85%	Rv =	0.84	
Area	A=	38.11	AC
RAINFALL	P=	1.2	IN
WQ VOL = Rv*A*P/12	WQ VOL=	3.20	AC-FT
9.66 AC-FT + 16.36 AC-FT = 26.02 AC-FT			
26.02 AC-FT > 3.20 AC-FT			

Table 3 - Proposed Conditions Summary								
				Peak Outflows by Storm Frequency (cfs)				
Basin/Pond	Area (AC)	Tc (min.)	CN	2 Year	5 Year	10 Year	25 Year	100 Year
WN-P1	35.60	67	70	15.1	34.0	43.1	55	78.3
WN-2 POST	21.62	15	96	61.9	81.1	94.5	111.5	143.6
WN-4 POST	16.49	15	96	47.2	61.9	72.0	85.1	109.5
WF-P4	170.00	104	68	68.7	108.9	141.3	188.1	285.8
WN-3	11.76	15	96	33.7	44.1	51.4	60.7	78.1
WN-P4	---	---	---	69.9	110.5	143.2	190.1	289.2
			POST TOTAL	249.3	330	402.3	500.4	695.3
			PRE TOTAL	153.1	240	301.8	387	559
WN-P2	---	---	---	78.6	124	160.8	210.5	317.3

Table 4A - Floodplain Storage Pre-developoment			
Elevation (Feet)	**Area (Acre)**	**Incr. Volume (Acre-Feet)**	**Floodplain Storage (Acre-Feet)**
1350	0	0.00	0.00
1351	2.53	1.27	1.27
1352	12.26	7.40	8.66
1352.4	16.53	5.76	14.42
1353	22.94	11.84	26.26
4.60 AC-FT + 14.98 AC-FT = 19.58 AC-FT			
19.58 AC-FT > 14.42 AC-FT			

Table 4B - Floodplain Storage Post Development Pond WN-P4				
Elevation (Feet)	**Area (Acre)**	**Incr. Volume (Acre-Feet)**	**Total Volume (Acre-Feet)**	**Floodplain Storage (Acre-Feet)**
1342	0.90	0.00	0.00	- - -
1343	0.97	0.94	0.94	- - -
1344	1.05	1.01	1.95	- - -
1345	1.12	1.08	3.03	- - -
1346	1.19	1.15	4.18	- - -
1347	1.27	1.23	5.41	- - -
1348	1.34	1.30	6.72	- - -
1349	1.42	1.38	8.10	- - -
1350	1.69	1.56	9.66	- - -
1351	1.92	1.81	11.46	1.81
1352	2.03	1.98	13.44	3.78
1352.4	2.08	0.82	14.26	4.60
1353	2.15	1.27	15.53	5.87

Table 4C - Floodplain Storage Post Development Pond WN-P2				
Elevation (Feet)	Area (Acre)	Incr. Volume (Acre-Feet)	Total Volume (Acre-Feet)	Floodplain Storage (Acre-Feet)
1341	1.11	0.00	0.00	---
1342	1.30	1.21	1.21	---
1343	1.55	1.43	2.63	---
1344	1.78	1.67	4.30	---
1345	2.01	1.90	6.20	---
1346	2.24	2.13	8.33	---
1347	2.48	2.36	10.69	---
1348	2.71	2.60	13.28	---
1349	3.45	3.08	16.36	---
1350	4.01	3.73	20.09	3.73
1351	4.58	4.30	24.39	8.03
1352	5.14	4.86	29.25	12.88
1352.4	5.36	2.10	31.35	14.98
1353	5.70	3.32	34.67	18.30

Time of concentration (Tc) or travel time (Tt)

Project : Newmarket Office **By:** JAG **Date:** 1/31/2011
Location : Wichita, Kansas **Checked:** **Date:**

Circle One: Present | Developed Basin: WN-2

Circle One: Tc | Tt through subarea

NOTES: Space for as many as two segments per flow type can be used for each worksheet.
Include map, schematic, or description of flow segments.

Sheet flow (Applicable to Tc only)

		Segment ID		
		AB		
1. Surface description (Table 3-1)		Smooth Surf.		
2. Mannings roughness coeff., n (Table 3-1)		0.011		
3. Flow length, L (total L < 300 ft.)	ft	300		
4. Two-yr 24-hr rainfall, P2	in	3.50		
5. Calculated Land slope, s	ft/ft	0.002		
5a. Land Elevation For Upper End Of Flow Path		1353.0		
5b. Land Elevation For Lower End Of Flow Path		1352.5		
6. Compute Tt	hr	0.13	=	0.13

Shallow concentrated flow

		Segment ID		
		BC		
7. Surface description (Paved or Unpaved)		Paved		
8. Flow length, L	ft	412		
9. Calculated Watercourse slope, s	ft/ft	0.008		
9a. Land Elevation For Upper End Of Flow Path		1352.5		
9b. Land Elevation For Lower End Of Flow Path		1349.0		
10. Average velocity, V (Figure 3-1)	ft/s	1.87		
11. Tt = L/3600V Compute Tt	hr	0.06	=	0.06

Channel Flow

		Segment ID		
		CD		
12. Cross sectional flow area, a	sf	100.00		
13. Wetted perimeter, Pw	ft	100		
14. Hydraulic radius, r = a/Pw Compute r	ft	1.000		
15. Channel slope, s	ft/ft	0.002		
16. Manning's roughness coeff., n		0.041		
17 V = 1.49(r^0.667)(s^0.50)/n Compute V	ft/s	1.6		
18. Flow length, L	ft	0		
19. Tt = L/3600V Compute Tt	hr	0.000	=	0.00
20. Watershed or subarea Tc or Tt (add Tt in steps 6,11, and 19)			hr	0.19

Reference: Urban Hydrology for Small Watersheds
Technical Release 55, Soil Conservation Service
U.S. Department of Agriculture, June 1986

Use Time Of Concentration = 15 Minutes

Time of concentration (Tc) or travel time (Tt)

Project : Newmarket Office **By:** JAG **Date:** 1/31/2011
Location : Wichita, Kansas **Checked:** **Date:**

Circle One: Present | Developed Basin: WN-4

Circle One: Tc | Tt through subarea

NOTES: Space for as many as two segments per flow type can be used for each worksheet.
Include map, schematic, or description of flow segments.

Sheet flow (Applicable to Tc only)

		Segment ID			
		AB			
1. Surface description (Table 3-1)		Smooth Surf.			
2. Mannings roughness coeff., n (Table 3-1)		0.011			
3. Flow length, L (total L < 300 ft.)	ft	300			
4. Two-yr 24-hr rainfall, P2	in	3.50			
5. Calculated Land slope, s	ft/ft	0.007			
5a. Land Elevation For Upper End Of Flow Path		1366.0			
5b. Land Elevation For Lower End Of Flow Path		1364.0			
6. Compute Tt	hr	0.07		=	0.07

Shallow concentrated flow

		Segment ID			
		BC			
7. Surface description (Paved or Unpaved)		Paved			
8. Flow length, L	ft	422			
9. Calculated Watercourse slope, s	ft/ft	0.033			
9a. Land Elevation For Upper End Of Flow Path		1364.0			
9b. Land Elevation For Lower End Of Flow Path		1350.0			
10. Average velocity, V (Figure 3-1)	ft/s	3.70			
11. Tt = L/3600V Compute Tt	hr	0.03		=	0.03

Channel Flow

		Segment ID			
		CD			
12. Cross sectional flow area, a	sf	100.00			
13. Wetted perimeter, Pw	ft	100			
14. Hydraulic radius, r = a/Pw Compute r	ft	1.000			
15. Channel slope, s	ft/ft	0.002			
16. Manning's roughness coeff., n		0.041			
17 V = 1.49(r^0.667)(s^0.50)/n Compute V	ft/s	1.6			
18. Flow length, L	ft	0			
19. Tt = L/3600V Compute Tt	hr	0.000		=	0.00
20. Watershed or subarea Tc or Tt (add Tt in steps 6,11, and 19)				hr	0.10

Reference: Urban Hydrology for Small Watersheds
Technical Release 55, Soil Conservation Service
U.S. Department of Agriculture, June 1986

Use Time Of Concentration = 15 Minutes

Project: NewMarket Office
Simulation Run: 2yr-24hr Subbasin: WN-2

Start of Run:	15Apr2006, 12:00	Basin Model:	Basin 1
End of Run:	22Apr2006, 20:00	Meteorologic Model:	2yr-24hr
Compute Time:	01Feb2011, 11:49:43	Control Specifications:	Control 1

Volume Units: IN

Computed Results

Peak Discharge :	61.9 (CFS)	Date/Time of Peak Discharge :	16Apr2006, 00:00
Total Precipitation :	3.50 (IN)	Total Direct Runoff :	2.93 (IN)
Total Loss :	0.57 (IN)	Total Baseflow :	0.00 (IN)
Total Excess :	2.93 (IN)	Discharge :	2.93 (IN)

Project: NewMarket Office
Simulation Run: 2yr-24hr Reservoir: WN-P2

Start of Run:	15Apr2006, 12:00	Basin Model:	Basin 1
End of Run:	22Apr2006, 20:00	Meteorologic Model:	2yr-24hr
Compute Time:	01Feb2011, 11:49:43	Control Specifications:	Control 1

Volume Units: IN

Computed Results

Peak Inflow :	122.4 (CFS)	Date/Time of Peak Inflow :	16Apr2006, 00:00
Peak Outflow :	78.6 (CFS)	Date/Time of Peak Outflow :	16Apr2006, 02:15
Total Inflow :	1.64 (IN)	Peak Storage :	4.8 (AC-FT)
Total Outflow :	1.63 (IN)	Peak Elevation :	1350.2 (FT)

Project: NewMarket Office
Simulation Run: 2yr-24hr Subbasin: WN-4

Start of Run:	15Apr2006, 12:00	Basin Model:	Basin 1
End of Run:	22Apr2006, 20:00	Meteorologic Model:	2yr-24hr
Compute Time:	01Feb2011, 11:49:43	Control Specifications:	Control 1

Volume Units: IN

Computed Results

Peak Discharge :	47.2 (CFS)	Date/Time of Peak Discharge :	16Apr2006, 00:00
Total Precipitation :	3.50 (IN)	Total Direct Runoff :	2.93 (IN)
Total Loss :	0.57 (IN)	Total Baseflow :	0.00 (IN)
Total Excess :	2.93 (IN)	Discharge :	2.93 (IN)

Project: NewMarket Office
Simulation Run: 2yr-24hr Reservoir: WN-P4

Start of Run:	15Apr2006, 12:00	Basin Model:	Basin 1
End of Run:	22Apr2006, 20:00	Meteorologic Model:	2yr-24hr
Compute Time:	01Feb2011, 11:49:43	Control Specifications:	Control 1

Volume Units: IN

Computed Results

Peak Inflow :	71.4 (CFS)	Date/Time of Peak Inflow :	16Apr2006, 01:45
Peak Outflow :	69.9 (CFS)	Date/Time of Peak Outflow :	16Apr2006, 02:00
Total Inflow :	1.59 (IN)	Peak Storage :	3.7 (AC-FT)
Total Outflow :	1.59 (IN)	Peak Elevation :	1351.1 (FT)

Project: NewMarket Office
Simulation Run: 2yr-24hr Subbasin: WN-3

Start of Run:	15Apr2006, 12:00	Basin Model:	Basin 1
End of Run:	22Apr2006, 20:00	Meteorologic Model:	2yr-24hr
Compute Time:	01Feb2011, 11:49:43	Control Specifications:	Control 1

Volume Units: IN

Computed Results

Peak Discharge :	33.7 (CFS)	Date/Time of Peak Discharge :	16Apr2006, 00:00
Total Precipitation :	3.50 (IN)	Total Direct Runoff :	2.93 (IN)
Total Loss :	0.57 (IN)	Total Baseflow :	0.00 (IN)
Total Excess :	2.93 (IN)	Discharge :	2.93 (IN)

Project: NewMarket Office
Simulation Run: 2yr-24hr Reservoir: WN-P1

Start of Run:	15Apr2006, 12:00	Basin Model:	Basin 1
End of Run:	22Apr2006, 20:00	Meteorologic Model:	2yr-24hr
Compute Time:	01Feb2011, 11:49:43	Control Specifications:	Control 1

Volume Units: IN

Computed Results

Peak Inflow :	23.0 (CFS)	Date/Time of Peak Inflow :	16Apr2006, 00:30
Peak Outflow :	15.1 (CFS)	Date/Time of Peak Outflow :	16Apr2006, 01:15
Total Inflow :	1.58 (IN)	Peak Storage :	4.3 (AC-FT)
Total Outflow :	0.93 (IN)	Peak Elevation :	1355.4 (FT)

Project: NewMarket Office
Simulation Run: 2yr-24hr Reservoir: WF-P4

Start of Run:	15Apr2006, 12:00	Basin Model:	Basin 1
End of Run:	22Apr2006, 20:00	Meteorologic Model:	2yr-24hr
Compute Time:	01Feb2011, 11:49:43	Control Specifications:	Control 1

Volume Units: IN

Computed Results

Peak Inflow :	111.3 (CFS)	Date/Time of Peak Inflow :	16Apr2006, 00:45
Peak Outflow :	68.7 (CFS)	Date/Time of Peak Outflow :	16Apr2006, 01:45
Total Inflow :	1.54 (IN)	Peak Storage :	47.3 (AC-FT)
Total Outflow :	1.54 (IN)	Peak Elevation :	1354.6 (FT)

Project: NewMarket Office
Simulation Run: 5YR-24HR Subbasin: WN-2

Start of Run:	15Apr2006, 12:00	Basin Model:	Basin 1
End of Run:	22Apr2006, 20:00	Meteorologic Model:	5YR-24HR
Compute Time:	01Feb2011, 11:54:16	Control Specifications:	Control 1

Volume Units: IN

Computed Results

Peak Discharge :	81.1 (CFS)	Date/Time of Peak Discharge :	16Apr2006, 00:00
Total Precipitation :	4.50 (IN)	Total Direct Runoff :	3.92 (IN)
Total Loss :	0.58 (IN)	Total Baseflow :	0.00 (IN)
Total Excess :	3.92 (IN)	Discharge :	3.92 (IN)

Project: NewMarket Office
Simulation Run: 5YR-24HR Reservoir: WN-P2

Start of Run:	15Apr2006, 12:00	Basin Model:	Basin 1
End of Run:	22Apr2006, 20:00	Meteorologic Model:	5YR-24HR
Compute Time:	01Feb2011, 11:54:16	Control Specifications:	Control 1

Volume Units: IN

Computed Results

Peak Inflow :	163.1 (CFS)	Date/Time of Peak Inflow :	16Apr2006, 00:00
Peak Outflow :	124.0 (CFS)	Date/Time of Peak Outflow :	16Apr2006, 02:15
Total Inflow :	2.41 (IN)	Peak Storage :	6.5 (AC-FT)
Total Outflow :	2.40 (IN)	Peak Elevation :	1350.6 (FT)

Project: NewMarket Office
Simulation Run: 5YR-24HR Subbasin: WN-4

Start of Run:	15Apr2006, 12:00	Basin Model:	Basin 1
End of Run:	22Apr2006, 20:00	Meteorologic Model:	5YR-24HR
Compute Time:	01Feb2011, 11:54:16	Control Specifications:	Control 1

Volume Units: IN

Computed Results

Peak Discharge :	61.9 (CFS)	Date/Time of Peak Discharge :	16Apr2006, 00:00
Total Precipitation :	4.50 (IN)	Total Direct Runoff :	3.92 (IN)
Total Loss :	0.58 (IN)	Total Baseflow :	0.00 (IN)
Total Excess :	3.92 (IN)	Discharge :	3.92 (IN)

Project: NewMarket Office
Simulation Run: 5YR-24HR Reservoir: WN-P4

Start of Run:	15Apr2006, 12:00	Basin Model:	Basin 1
End of Run:	22Apr2006, 20:00	Meteorologic Model:	5YR-24HR
Compute Time:	01Feb2011, 11:54:16	Control Specifications:	Control 1

Volume Units: IN

Computed Results

Peak Inflow :	112.4 (CFS)	Date/Time of Peak Inflow :	16Apr2006, 01:45
Peak Outflow :	110.5 (CFS)	Date/Time of Peak Outflow :	16Apr2006, 02:00
Total Inflow :	2.35 (IN)	Peak Storage :	4.4 (AC-FT)
Total Outflow :	2.35 (IN)	Peak Elevation :	1351.5 (FT)

Project: NewMarket Office
Simulation Run: 5YR-24HR Subbasin: WN-3

Start of Run:	15Apr2006, 12:00	Basin Model:	Basin 1
End of Run:	22Apr2006, 20:00	Meteorologic Model:	5YR-24HR
Compute Time:	01Feb2011, 15:28:58	Control Specifications:	Control 1

Volume Units: IN

Computed Results

Peak Discharge :	44.1 (CFS)	Date/Time of Peak Discharge :	16Apr2006, 00:00
Total Precipitation :	4.50 (IN)	Total Direct Runoff :	3.92 (IN)
Total Loss :	0.58 (IN)	Total Baseflow :	0.00 (IN)
Total Excess :	3.92 (IN)	Discharge :	3.92 (IN)

Project: NewMarket Office
Simulation Run: 5YR-24HR Reservoir: WN-P1

Start of Run:	15Apr2006, 12:00	Basin Model:	Basin 1
End of Run:	22Apr2006, 20:00	Meteorologic Model:	5YR-24HR
Compute Time:	01Feb2011, 11:54:16	Control Specifications:	Control 1

Volume Units: IN

Computed Results

Peak Inflow :	35.2 (CFS)	Date/Time of Peak Inflow :	16Apr2006, 00:30
Peak Outflow :	34.0 (CFS)	Date/Time of Peak Outflow :	16Apr2006, 00:45
Total Inflow :	2.32 (IN)	Peak Storage :	4.4 (AC-FT)
Total Outflow :	1.65 (IN)	Peak Elevation :	1355.5 (FT)

Project: NewMarket Office
Simulation Run: 5YR-24HR Reservoir: WF-P4

Start of Run:	15Apr2006, 12:00	Basin Model:	Basin 1
End of Run:	22Apr2006, 20:00	Meteorologic Model:	5YR-24HR
Compute Time:	01Feb2011, 11:54:16	Control Specifications:	Control 1

Volume Units: IN

Computed Results

Peak Inflow :	167.5 (CFS)	Date/Time of Peak Inflow :	16Apr2006, 00:45
Peak Outflow :	108.9 (CFS)	Date/Time of Peak Outflow :	16Apr2006, 01:45
Total Inflow :	2.29 (IN)	Peak Storage :	50.9 (AC-FT)
Total Outflow :	2.28 (IN)	Peak Elevation :	1355.1 (FT)

Project: NewMarket Office
Simulation Run: 10YR-24HR Subbasin: WN-2

Start of Run:	15Apr2006, 12:00	Basin Model:	Basin 1
End of Run:	22Apr2006, 20:00	Meteorologic Model:	10YR-24HR
Compute Time:	01Feb2011, 12:53:25	Control Specifications:	Control 1

Volume Units: IN

Computed Results

Peak Discharge :	94.5 (CFS)	Date/Time of Peak Discharge :	16Apr2006, 00:00
Total Precipitation :	5.20 (IN)	Total Direct Runoff :	4.62 (IN)
Total Loss :	0.58 (IN)	Total Baseflow :	0.00 (IN)
Total Excess :	4.62 (IN)	Discharge :	4.62 (IN)

Project: NewMarket Office
Simulation Run: 10YR-24HR Reservoir: WN-P2

Start of Run:	15Apr2006, 12:00	Basin Model:	Basin 1
End of Run:	22Apr2006, 20:00	Meteorologic Model:	10YR-24HR
Compute Time:	01Feb2011, 12:53:25	Control Specifications:	Control 1

Volume Units: IN

Computed Results

Peak Inflow :	192.1 (CFS)	Date/Time of Peak Inflow :	16Apr2006, 00:00
Peak Outflow :	160.8 (CFS)	Date/Time of Peak Outflow :	16Apr2006, 02:00
Total Inflow :	2.98 (IN)	Peak Storage :	7.7 (AC-FT)
Total Outflow :	2.98 (IN)	Peak Elevation :	1350.9 (FT)

Project: NewMarket Office
Simulation Run: 10YR-24HR Subbasin: WN-4

Start of Run:	15Apr2006, 12:00	Basin Model:	Basin 1
End of Run:	22Apr2006, 20:00	Meteorologic Model:	10YR-24HR
Compute Time:	01Feb2011, 12:53:25	Control Specifications:	Control 1

Volume Units: IN

Computed Results

Peak Discharge :	72.0 (CFS)	Date/Time of Peak Discharge :	16Apr2006, 00:00
Total Precipitation :	5.20 (IN)	Total Direct Runoff :	4.62 (IN)
Total Loss :	0.58 (IN)	Total Baseflow :	0.00 (IN)
Total Excess :	4.62 (IN)	Discharge :	4.62 (IN)

Project: NewMarket Office
Simulation Run: 10YR-24HR Reservoir: WN-P4

Start of Run:	15Apr2006, 12:00	Basin Model:	Basin 1
End of Run:	22Apr2006, 20:00	Meteorologic Model:	10YR-24HR
Compute Time:	01Feb2011, 12:53:25	Control Specifications:	Control 1

Volume Units: IN

Computed Results

Peak Inflow :	145.3 (CFS)	Date/Time of Peak Inflow :	16Apr2006, 01:45
Peak Outflow :	143.2 (CFS)	Date/Time of Peak Outflow :	16Apr2006, 02:00
Total Inflow :	2.91 (IN)	Peak Storage :	4.9 (AC-FT)
Total Outflow :	2.91 (IN)	Peak Elevation :	1351.8 (FT)

Project: NewMarket Office
Simulation Run: 10YR-24HR Subbasin: WN-3

Start of Run:	15Apr2006, 12:00	Basin Model:	Basin 1
End of Run:	22Apr2006, 20:00	Meteorologic Model:	10YR-24HR
Compute Time:	01Feb2011, 12:53:25	Control Specifications:	Control 1

Volume Units: IN

Computed Results

Peak Discharge :	51.4 (CFS)	Date/Time of Peak Discharge :	16Apr2006, 00:00
Total Precipitation :	5.20 (IN)	Total Direct Runoff :	4.62 (IN)
Total Loss :	0.58 (IN)	Total Baseflow :	0.00 (IN)
Total Excess :	4.62 (IN)	Discharge :	4.62 (IN)

Project: NewMarket Office
Simulation Run: 10YR-24HR Reservoir: WN-P1

Start of Run:	15Apr2006, 12:00	Basin Model:	Basin 1
End of Run:	22Apr2006, 20:00	Meteorologic Model:	10YR-24HR
Compute Time:	01Feb2011, 12:53:25	Control Specifications:	Control 1

Volume Units: IN

Computed Results

Peak Inflow :	44.5 (CFS)	Date/Time of Peak Inflow :	16Apr2006, 00:30
Peak Outflow :	43.1 (CFS)	Date/Time of Peak Outflow :	16Apr2006, 00:45
Total Inflow :	2.88 (IN)	Peak Storage :	4.4 (AC-FT)
Total Outflow :	2.30 (IN)	Peak Elevation :	1355.5 (FT)

Project: NewMarket Office
Simulation Run: 10YR-24HR Reservoir: WF-P4

Start of Run:	15Apr2006, 12:00	Basin Model:	Basin 1
End of Run:	22Apr2006, 20:00	Meteorologic Model:	10YR-24HR
Compute Time:	01Feb2011, 12:53:25	Control Specifications:	Control 1

Volume Units: IN

Computed Results

Peak Inflow :	210.2 (CFS)	Date/Time of Peak Inflow :	16Apr2006, 00:45
Peak Outflow :	141.3 (CFS)	Date/Time of Peak Outflow :	16Apr2006, 01:45
Total Inflow :	2.85 (IN)	Peak Storage :	53.5 (AC-FT)
Total Outflow :	2.84 (IN)	Peak Elevation :	1355.4 (FT)

Project: NewMarket Office
Simulation Run: 25YR-24HR Subbasin: WN-2

Start of Run:	15Apr2006, 12:00	Basin Model:	Basin 1
End of Run:	22Apr2006, 20:00	Meteorologic Model:	25YR-24HR
Compute Time:	01Feb2011, 12:56:08	Control Specifications:	Control 1

Volume Units: IN

Computed Results

Peak Discharge :	111.5 (CFS)	Date/Time of Peak Discharge :	16Apr2006, 00:00
Total Precipitation :	6.10 (IN)	Total Direct Runoff :	5.51 (IN)
Total Loss :	0.59 (IN)	Total Baseflow :	0.00 (IN)
Total Excess :	5.51 (IN)	Discharge :	5.51 (IN)

Project: NewMarket Office
Simulation Run: 25YR-24HR Reservoir: WN-P2

Start of Run:	15Apr2006, 12:00	Basin Model:	Basin 1
End of Run:	22Apr2006, 20:00	Meteorologic Model:	25YR-24HR
Compute Time:	01Feb2011, 12:56:08	Control Specifications:	Control 1

Volume Units: IN

Computed Results

Peak Inflow :	230.6 (CFS)	Date/Time of Peak Inflow :	16Apr2006, 00:00
Peak Outflow :	210.5 (CFS)	Date/Time of Peak Outflow :	16Apr2006, 02:00
Total Inflow :	3.73 (IN)	Peak Storage :	9.5 (AC-FT)
Total Outflow :	3.73 (IN)	Peak Elevation :	1351.3 (FT)

Project: NewMarket Office
Simulation Run: 25YR-24HR Subbasin: WN-4

Start of Run:	15Apr2006, 12:00	Basin Model:	Basin 1
End of Run:	22Apr2006, 20:00	Meteorologic Model:	25YR-24HR
Compute Time:	01Feb2011, 12:56:08	Control Specifications:	Control 1

Volume Units: IN

Computed Results

Peak Discharge :	85.1 (CFS)	Date/Time of Peak Discharge :	16Apr2006, 00:00
Total Precipitation :	6.10 (IN)	Total Direct Runoff :	5.51 (IN)
Total Loss :	0.59 (IN)	Total Baseflow :	0.00 (IN)
Total Excess :	5.51 (IN)	Discharge :	5.51 (IN)

Project: NewMarket Office
Simulation Run: 25YR-24HR Reservoir: WN-P4

Start of Run:	15Apr2006, 12:00	Basin Model:	Basin 1
End of Run:	22Apr2006, 20:00	Meteorologic Model:	25YR-24HR
Compute Time:	01Feb2011, 12:56:08	Control Specifications:	Control 1

Volume Units: IN

Computed Results

Peak Inflow :	192.9 (CFS)	Date/Time of Peak Inflow :	16Apr2006, 01:45
Peak Outflow :	190.1 (CFS)	Date/Time of Peak Outflow :	16Apr2006, 02:00
Total Inflow :	3.66 (IN)	Peak Storage :	5.6 (AC-FT)
Total Outflow :	3.66 (IN)	Peak Elevation :	1352.2 (FT)

Project: NewMarket Office
Simulation Run: 25YR-24HR Subbasin: WN-3

Start of Run:	15Apr2006, 12:00	Basin Model:	Basin 1
End of Run:	22Apr2006, 20:00	Meteorologic Model:	25YR-24HR
Compute Time:	01Feb2011, 12:56:08	Control Specifications:	Control 1

Volume Units: IN

Computed Results

Peak Discharge :	60.7 (CFS)	Date/Time of Peak Discharge :	16Apr2006, 00:00
Total Precipitation :	6.10 (IN)	Total Direct Runoff :	5.51 (IN)
Total Loss :	0.59 (IN)	Total Baseflow :	0.00 (IN)
Total Excess :	5.51 (IN)	Discharge :	5.51 (IN)

Project: NewMarket Office
Simulation Run: 25YR-24HR Reservoir: WN-P1

Start of Run:	15Apr2006, 12:00	Basin Model:	Basin 1
End of Run:	22Apr2006, 20:00	Meteorologic Model:	25YR-24HR
Compute Time:	01Feb2011, 12:56:08	Control Specifications:	Control 1

Volume Units: IN

Computed Results

Peak Inflow :	56.9 (CFS)	Date/Time of Peak Inflow :	16Apr2006, 00:30
Peak Outflow :	55.0 (CFS)	Date/Time of Peak Outflow :	16Apr2006, 00:45
Total Inflow :	3.62 (IN)	Peak Storage :	4.4 (AC-FT)
Total Outflow :	2.94 (IN)	Peak Elevation :	1355.5 (FT)

Project: NewMarket Office
Simulation Run: 25YR-24HR Reservoir: WF-P4

Start of Run:	15Apr2006, 12:00	Basin Model:	Basin 1
End of Run:	22Apr2006, 20:00	Meteorologic Model:	25YR-24HR
Compute Time:	01Feb2011, 12:56:08	Control Specifications:	Control 1

Volume Units: IN

Computed Results

Peak Inflow :	267.6 (CFS)	Date/Time of Peak Inflow :	16Apr2006, 00:45
Peak Outflow :	188.1 (CFS)	Date/Time of Peak Outflow :	16Apr2006, 01:45
Total Inflow :	3.59 (IN)	Peak Storage :	57.1 (AC-FT)
Total Outflow :	3.58 (IN)	Peak Elevation :	1355.8 (FT)

Project: NewMarket Office
Simulation Run: 100yr-24hr Subbasin: WN-2

Start of Run:	15Apr2006, 12:00	Basin Model:	Basin 1
End of Run:	22Apr2006, 20:00	Meteorologic Model:	100 yr. - 24 hrs.
Compute Time:	01Feb2011, 12:58:22	Control Specifications:	Control 1

Volume Units: IN

Computed Results

Peak Discharge :	143.6 (CFS)	Date/Time of Peak Discharge :	16Apr2006, 00:00
Total Precipitation :	7.80 (IN)	Total Direct Runoff :	7.20 (IN)
Total Loss :	0.60 (IN)	Total Baseflow :	0.00 (IN)
Total Excess :	7.20 (IN)	Discharge :	7.20 (IN)

Project: NewMarket Office
Simulation Run: 100yr-24hr Reservoir: WN-P2

Start of Run:	15Apr2006, 12:00	Basin Model:	Basin 1
End of Run:	22Apr2006, 20:00	Meteorologic Model:	100 yr. - 24 hrs.
Compute Time:	01Feb2011, 12:58:22	Control Specifications:	Control 1

Volume Units: IN

Computed Results

Peak Inflow :	329.0 (CFS)	Date/Time of Peak Inflow :	16Apr2006, 01:45
Peak Outflow :	317.3 (CFS)	Date/Time of Peak Outflow :	16Apr2006, 02:00
Total Inflow :	5.23 (IN)	Peak Storage :	13.0 (AC-FT)
Total Outflow :	5.22 (IN)	Peak Elevation :	1352.0 (FT)

Project: NewMarket Office
Simulation Run: 100yr-24hr Subbasin: WN-4

Start of Run:	15Apr2006, 12:00	Basin Model:	Basin 1
End of Run:	22Apr2006, 20:00	Meteorologic Model:	100 yr. - 24 hrs.
Compute Time:	01Feb2011, 12:58:22	Control Specifications:	Control 1

Volume Units: IN

Computed Results

Peak Discharge :	109.5 (CFS)	Date/Time of Peak Discharge :	16Apr2006, 00:00
Total Precipitation :	7.80 (IN)	Total Direct Runoff :	7.20 (IN)
Total Loss :	0.60 (IN)	Total Baseflow :	0.00 (IN)
Total Excess :	7.20 (IN)	Discharge :	7.20 (IN)

Project: NewMarket Office
Simulation Run: 100yr-24hr Reservoir: WN-P4

Start of Run:	15Apr2006, 12:00	Basin Model:	Basin 1
End of Run:	22Apr2006, 20:00	Meteorologic Model:	100 yr. - 24 hrs.
Compute Time:	01Feb2011, 12:58:22	Control Specifications:	Control 1

Volume Units: IN

Computed Results

Peak Inflow :	291.9 (CFS)	Date/Time of Peak Inflow :	16Apr2006, 01:45
Peak Outflow :	289.2 (CFS)	Date/Time of Peak Outflow :	16Apr2006, 01:45
Total Inflow :	5.15 (IN)	Peak Storage :	6.9 (AC-FT)
Total Outflow :	5.13 (IN)	Peak Elevation :	1352.8 (FT)

Project: NewMarket Office
Simulation Run: 100yr-24hr Subbasin: WN-3

Start of Run:	15Apr2006, 12:00	Basin Model:	Basin 1
End of Run:	22Apr2006, 20:00	Meteorologic Model:	100 yr. - 24 hrs.
Compute Time:	01Feb2011, 12:58:22	Control Specifications:	Control 1

Volume Units: IN

Computed Results

Peak Discharge :	78.1 (CFS)	Date/Time of Peak Discharge :	16Apr2006, 00:00
Total Precipitation :	7.80 (IN)	Total Direct Runoff :	7.20 (IN)
Total Loss :	0.60 (IN)	Total Baseflow :	0.00 (IN)
Total Excess :	7.20 (IN)	Discharge :	7.20 (IN)

Project: NewMarket Office
Simulation Run: 100yr-24hr Reservoir: WN-P1

Start of Run:	15Apr2006, 12:00	Basin Model:	Basin 1
End of Run:	22Apr2006, 20:00	Meteorologic Model:	100 yr. - 24 hrs.
Compute Time:	01Feb2011, 12:58:22	Control Specifications:	Control 1

Volume Units: IN

Computed Results

Peak Inflow :	81.3 (CFS)	Date/Time of Peak Inflow :	16Apr2006, 00:30
Peak Outflow :	78.3 (CFS)	Date/Time of Peak Outflow :	16Apr2006, 00:45
Total Inflow :	5.10 (IN)	Peak Storage :	4.5 (AC-FT)
Total Outflow :	4.41 (IN)	Peak Elevation :	1355.6 (FT)

Project: NewMarket Office
Simulation Run: 100yr-24hr Reservoir: WF-P4

Start of Run:	15Apr2006, 12:00	Basin Model:	Basin 1
End of Run:	22Apr2006, 20:00	Meteorologic Model:	100 yr. - 24 hrs.
Compute Time:	01Feb2011, 12:58:22	Control Specifications:	Control 1

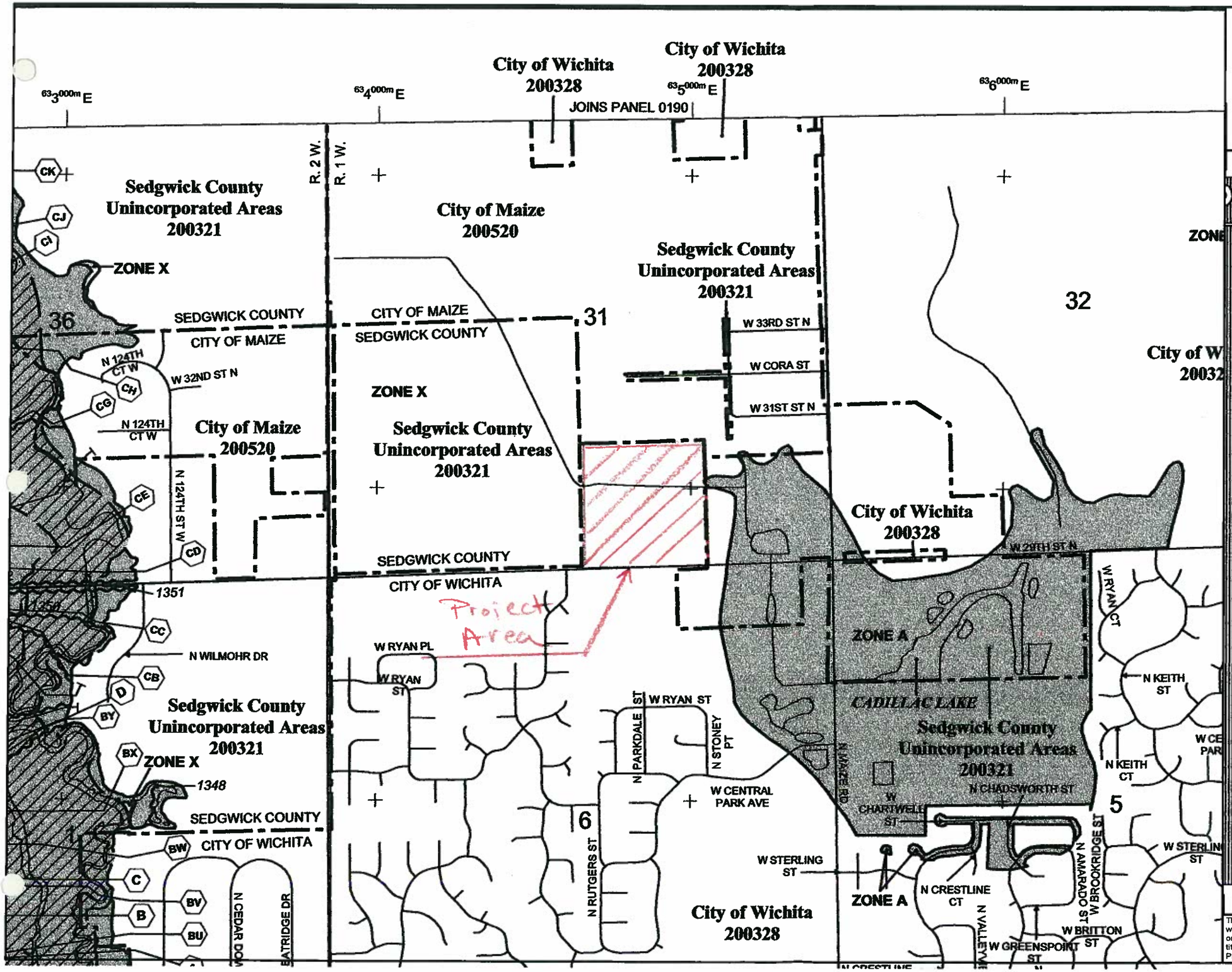
Volume Units: IN

Computed Results

Peak Inflow :	389.5 (CFS)	Date/Time of Peak Inflow :	16Apr2006, 01:00
Peak Outflow :	285.8 (CFS)	Date/Time of Peak Outflow :	16Apr2006, 01:45
Total Inflow :	5.07 (IN)	Peak Storage :	64.3 (AC-FT)
Total Outflow :	5.06 (IN)	Peak Elevation :	1356.6 (FT)

Tab 4
Floodplain Submittal

Site is not within a FEMA Floodplain.



PANEL 0330E

FIRM

FLOOD INSURANCE RATE MAP

SEDGWICK COUNTY, KANSAS
AND INCORPORATED AREAS

PANEL 330 OF 700

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
MAIZE, CITY OF	200520	0330	E
SEDGWICK COUNTY	200321	0330	E
WICHITA, CITY OF	200328	0330	E

Notice to User: The **Map Number** shown below should be used when placing map orders; the **Community Number** shown above should be used on insurance applications for the subject community.

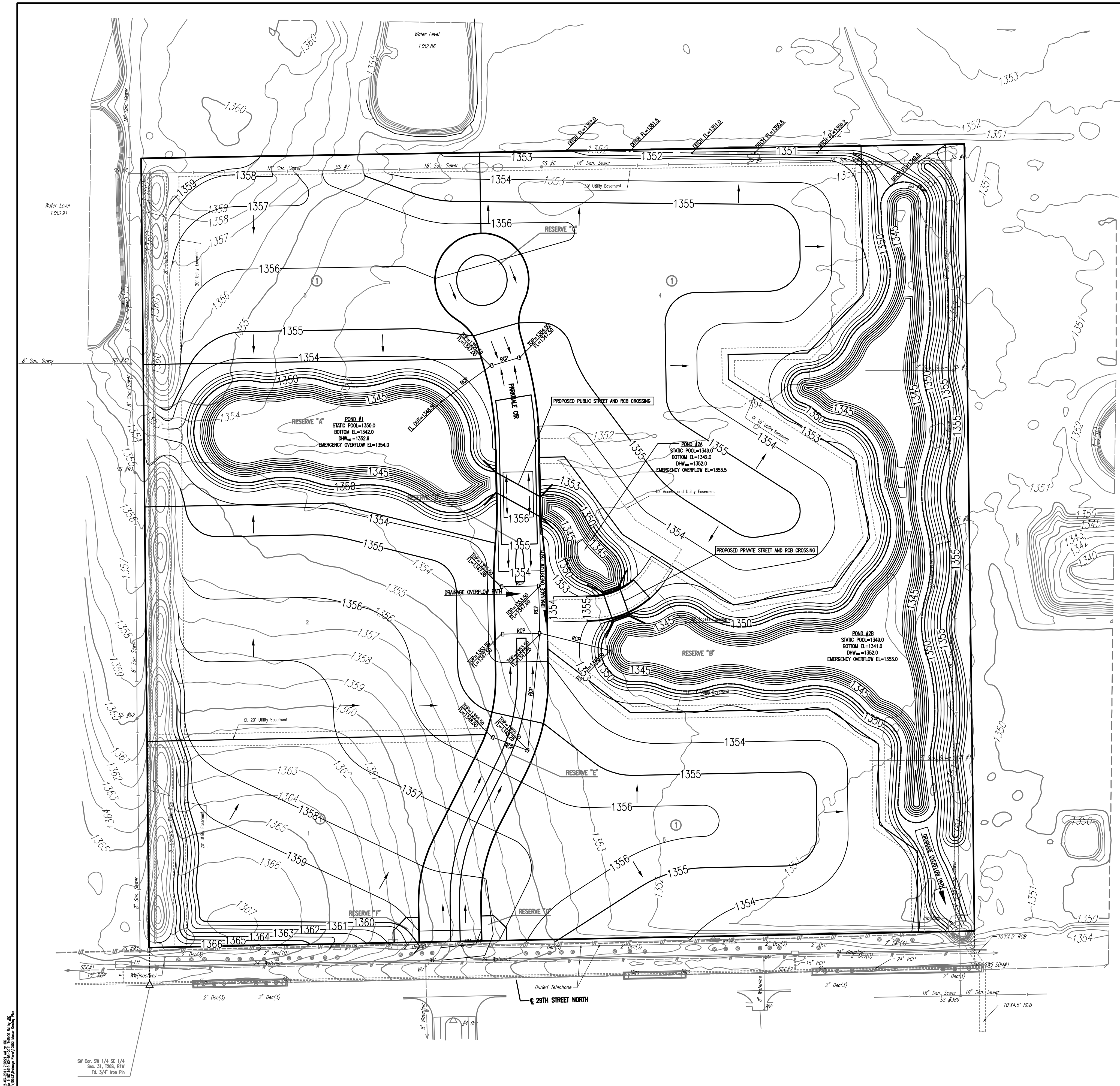
MAP NUMBER
20173C0330E

EFFECTIVE DATE
FEBRUARY 2, 2007
Federal Emergency Management Agency

Tab 5
Federal, State, and Local Permits

Kansas State permits that are required will be prepared and filed as part of site final design under a petitioned project if the project proceeds further.

Tab 6
Master Grading Plan



LEGEND

→	=	FLOW DIRECTION
TOP	=	TOP OF INLET
FL	=	FLOWLINE OF PIPE
TC	=	TOP OF CURB
——1356——	=	EXISTING CONTOUR LINE (1' CONTOUR INTERVAL)
——1356——	=	PROPOSED CONTOUR LINE (1' CONTOUR INTERVAL)
DRAINAGE OVERFLOW PATH	=	DRAINAGE OVERFLOW PATH
RCP	=	PROPOSED CURB INLET AND RCP

MINIMUM PAD ELEVATIONS (LOWEST OPENING) SHALL BE AS FOLLOWS:

BLOCK 1	N.A.V.D. 88
LOTS 2 & 3	1355.0
LOTS 4 & 5	1354.0

PLAT DRAWING:
ONE-STEP PLAT (SUBMITTED JANUARY 31, 2011)

BENCHMARKS:

BM #9

T-POST 70' +/- WEST AND 75' SOUTH OF NORTHEAST CORNER SW 1/4 SE 1/4 SEC. 31, T26S, R1W

ELEV. 1351.58 NAVD 88

BM #9A

CHISELED SQUARE AT NORTHEAST CORNER OF CONCRETE DRIVE APPROACH, SOUTH SIDE OF SIDEWALK ON NORTH SIDE OF 29TH STREET, AT INTERSECTION OF 29TH AND PARKDALE.

ELEV. 1359.26 NAVD 88

STORM SEWER:

SDC #1
CURB INLET
TOP 1364.65
15" RCP (S) FL 1360.65

SDC #2
CURB INLET
TOP 1353.88
15" RCP (S) FL 1350.43

SDM #1
MANHOLE
TOP 1355.02
24" RCP (W) FL 1347.42

RCBC
10' WIDE X 4.5' HIGH
TOP OF HEADWALL 1355.26
FL 1347.56

No.	Revision	By	Date

MASTER GRADING PLAN
NEWMARKET OFFICE 2ND
WICHITA, KANSAS

Professional Engineering Consultants, P.A.
303 S. TOPEKA • WICHITA, KANSAS 67202
316-262-2691 • FAX 316-262-3003

Designed by	JEH	Job No.	10553	Sht. 1 of 1
Drawn by	IDK, AEE	Date	02/02/11	